

Psychological Bulletin

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THE PSYCHOLOGICAL BULLETIN

MENTAL ABILITIES RELATED TO LEARNING TO SPELL*

BY E. G. WILLIAMSON

University of Minnesota

One of the most complete descriptions of the psychological processes involved in spelling has been made by Hollingworth (19, 20, 21) as a result of her clinical examination of "poor" spellers. Her description is presented in an abbreviated form as an introduction to this review.

Since language may be considered as a psychological unit, achievement in reading, spelling, composition, and foreign languages should be closely related. The learning of linguistic behavior is, therefore, analyzable into these important processes:

1. A particular vocal sound becomes habitually associated with an object, act, quality, or relation.

2. The sound or word becomes associated with the articulatory behavior which produces that sound or word.

3. Certain printed or written symbols become attached to the original object and to the vocal sounds which are its representatives. When the symbol is experienced, the corresponding vocal sounds are produced in reading.

4. The separate letters of these written symbols become fixed in their proper order and can be reproduced in this sequence in spelling.

5. This order of letters is translated into the corresponding muscular behavior of arm and fingers in writing.

6. The written symbols and the motor responses necessary to produce them become consciously associated so that one leads to the other.

* Dr. W. T. Heron gave much assistance in the preparation of this review.

Such an analysis of linguistic functions makes easier the task of determining experimentally the psychological factors involved in learning to spell. This analysis will be used, therefore, as an outline in this review of the important experimental literature dealing with mental factors related to learning to spell.

1. *Sensory defects* of the ear or eye may interfere with adequate perception of words. But Gates (14) found that only one of his subjects (one hundred thirty-five school children) had any difficulty in pitch discrimination when tested with tuning forks, Seashore's test of musical ability, the watch test, and phonetic units such as "nub," "sug," "rip," etc. Only four of these same subjects had visual defects which were "probably primarily responsible for backwardness in reading and spelling." Witmer (39) reported one case in which double vision contributed to spelling disability.

2. *General intelligence*, apparently, is not significantly related to spelling since the coefficients of correlation cluster around $+0.5$. Moreover, Gates and Hollingworth each found cases of poor spellers among both the high and low subjects in intelligence tests. Gates (15) reported an average correlation of $+0.42$ between Buckingham spelling tests and verbal group intelligence tests, such as the National, Haggerty, and Otis, for children in the third to the eighth grades, and $+0.41$ for three hundred subjects in grades 1-6, using the Stanford-Binet intelligence test (14). Hollingworth (19) reported coefficients of $+0.08$ and $+0.23$ for spelling and mental age on the Stanford-Binet for two groups, each of 30 "poor" spellers, who were school children. The correlations between I.Q. and spelling for the same subjects are $+0.16$ and $+0.31$. Sister Mary (35) reported coefficients of similar magnitude.

Omwake (31) reported a correlation of $+0.173$ between the spelling scores of 150 college students and Army Alpha. The spelling list consisted of 100 words from Buckingham's extension of the Ayres Spelling Scale. The correlation between 50 words of Ayres' Scale and the National Intelligence Test for 450 pupils in the fifth, sixth, and seventh grades was $+0.448$. The correlation between M.A. and 100 spelling words for 34 eighth grade students was $+0.602$. Despite this significant decrease in the size of the correlations from grade school to college students, Omwake contends that intelligence is not significantly related to spelling, since a few college students low in intelligence received perfect scores in spelling. But the range in spelling scores decreased markedly from the grade to college subjects, a condition which may account for the decrease in

the coefficient of correlation. Indeed, Omwake admits that, in the case of the eighth grade subjects, "the wide range of intelligence and spelling ability in the group is undoubtedly one of the chief causes of the high correlation between spelling scores and M.A. of this particular group." In view of this decrease in variability, it seems that a reasonable interpretation of the low correlation of $+0.173$ is found in the probability that her spelling list was too easy for college students and therefore did not differentiate levels of spelling ability. But Omwake stated that: "If, to take an extreme example, a comparison were made between the spelling ability and the intelligence of a group of pupils in the first grade, another group in the eighth grade, and another in college, there would appear to be an almost perfect relationship between ability to spell and intelligence. This, however, would not be the case, but would be due to comparing unlike groups."

The writer (38) found a correlation of $+0.72$ between spelling and intelligence for high school seniors where the coefficient of variability for the spelling list was 0.28 and 0.69 for the intelligence test. The spelling list consisted of 40 of the most difficult words from Van Wagenen's Spelling Scale and 50 difficult words from Roget's Thesaurus; the intelligence test was the Minnesota College Aptitude Test, form A M C N. No student low in intelligence made a high score in spelling.

Carroll (8, 9, 10) explained the relationship between spelling errors and intelligence in terms of differences in ability to generalize. "Bright" children in the fourth and fifth grades tended to misspell because of phonetic generalization, that is, difficulty in selecting the correct phonetic equivalents for dictated words. These "bright" children seem to have more phonetic associations, a condition which is confusing in the selection of the correctly written equivalents. Possibly Carroll's results may be explained in terms of differences in capacity for logical as opposed to rote memory. Carroll's study confirms Horn's contention that the illogical construction of English words explains much of the difficulty in learning to spell. If the spelling system were reconstructed, apparently "bright" children would have less difficulty with spelling and probably the "dull" children would not have a greater handicap than at present.

3. *Faulty pronunciation* may lead to errors of spelling such as "whent" for "went" and "afterwoods" for "afterwards." These errors may be caused by inadequate association of verbal sounds with the articulatory behavior of the individual, to faulty auditory percep-

tion, or to articulatory difficulties such as stammering. No experimental study has been made of this cause of poor spelling, but Book (6) has reported an interesting case of a boy who could not spell because he could not talk properly and was trying to spell by sound. Horn (23, 24) has emphasized the confusion and difficulty of learning to spell certain English words resulting from phonetic factors. Pressey (32) has reported a plan of teaching spelling which emphasizes the sound of vowels and consonants, and syllables.

4. Poor spelling may be due also to inadequate *visual perceptual habits* in the detection of the make-up of a word. Hollingworth (21) found a tendency for more misspellings to be made in the latter half than in the first half of words. If visual perception is inadequate, then the individual will perceive clearly only the first half of the word and not the last few letters. Because he does not perceive these letters clearly, he is apt to misspell them. This explanation is confirmed by Ayres' (4) earlier report of a correlation of $+ .73$ between spelling difficulty and the length of words. The more letters there are in a word, the more difficult it becomes to perceive all these letters distinctly. Mendenhall (30) found the "hard spot" in spelling to be at the center or to the right of the center of long words. Carroll found that the length of words influenced differently the spelling accuracy of bright and dull pupils. Another indication of the importance of perceptual factors in spelling is shown by the fact that Gates (15) found an average correlation of $+ .55$ between spelling and the detection of "small differences between pairs of words," and $+ .63$ between spelling and the recognition of the correct spelling of a word from four incorrect spellings. Sister Mary (35) confirmed Gates' results with similar tests but found that these tests varied in reliability from $.46$ to $.72$, a condition which indicated that the true correlations are higher than those obtained by both investigators. Gates interpreted his correlations to indicate the importance for correct spelling of the ability to detect the essential details of words or "word-perception." Gates' (16) later investigation has extended this theory of "word-perception" to deaf subjects. E. K. Carmen (7), working under Thorndike in 1900, seems to have been the first to investigate this factor of visual perception in relation to spelling. Eight adult good spellers were differentiated from eight adult poor spellers by the average number of misspelled words detected in a printed page containing one hundred misspelled words. Carmen concluded that "ability to spell well probably implies not a general habit or power of observation, but a special ability to notice small

differences in words." In the same report Carmen says, "It would seem that the directing of attention to the appearance of words in the whole field of early reading would fix the correct forms in the mind and establish the habit of noticing spelling, so that later reading would provide the definite knowledge necessary." Then comes this generalization, which has been confirmed with more adequate experimental evidence by Gates and Sister Mary, "Good spelling has as its basis, observation."

5. Certain people may require an *unusual number of repetitions of a word in order to learn its spelling*. Such a disability may be due to the subject's inability to form any kind of an association between letters or it may be caused by a short memory span. In the latter case, long words would be misspelled more frequently than short words. This tendency to shorten words, therefore, may be due to inadequate perception of the latter half of words or to short memory span. Kiefer and Sangren found that some of their poor spellers, university students, had a short span of visual apprehension. A short span may explain, in part, the fact that the number of misspellings increases with an increase in the length of the word. Hartmann (17) found a relationship between spelling and the "special reaction involved in reproducing tachistoscopically-exposed stimuli of a meaningful nature." Kiefer and Sangren (29) also found a correlation of $+0.57$ between spelling and rote memory in learning foreign words. Washburn (11, 27) found slight differences between good and poor spellers in accuracy of recall of visual non-verbal material, speed of recognizing words, speed of perception and the appropriate reaction, and numbers of words constructed from a given list of letters. The differences probably are not significant.

6. *Knowledge of the meaning of the words to be spelled* contributes to the ease with which their spelling is learned. Hollingworth (21) found that her subjects made more errors in constructing sentences with misspelled words than with words spelled correctly. The correlation between ability to spell and ability to use words was $+0.55$. Houser (26) found an average correlation of $+0.62$ between ability to spell and ability to define the same words for school children in the fourth to eighth grades inclusive.

7. *Quality of handwriting* has been considered important in spelling, but Gates (14) found an average correlation of only $+0.18$ between these two factors.

8. Case studies have revealed the fact that some misspellings are due to *temporary lapses*. Hollingworth (19) gives the example of

"It mak make an impression" for "It may make an impression." Very little is known of the causes of these lapses, their frequency of appearance, and other characteristics. Bawden (5) has published a lengthy and theoretical article attempting to explain and describe these phenomena.

9. The *transfer of habits* from a foreign language may cause the misspelling of some words. The writer has found no such cases reported in the clinical literature.

10. *Idiosyncrasies*, such as adding final "e" to all words, appear in a few cases of poor spelling. Examination of individual cases, as with lapses, will reveal the cause of such idiosyncrasies. Travis (34) reported a case in which emotional experiences caused the misspelling of particular words associated with those experiences.

11. *Temperamental factors* such as distaste for intellectual drudgery, lack of incentive, and other related factors may account for some poor spellers. This is especially true in the case of English words which are highly specific; spelling becomes a matter of learning thousands of combinations of letters. It requires much persuasion to convince some adults that correct spelling is worth such drudgery. The author, using Hollingworth's method of diagnosis, found a college student of high intelligence whose general emotional instability and dislike of routine drill resulted in failure to meet the minimum spelling requirements of a college English department.

12. Earle's early work (12) led him to conclude that there was an *hereditary factor* in spelling. But much more experimental work needs to be done before such a theory can be accepted. Hollingworth (21) has advanced what amounts to a similar theory under the name of "special disability," that is, those individuals at the lower end of the distribution of spelling scores may have an innate disability for forming connections between letters.

13. Abernethy (1) measured *eye movements* by the Gray-Buswell method while eighth grade and college subjects were learning to spell difficult words. The eye movements were similar to those disclosed in reading studies; adults tended to study by syllables and made repeated surveys with regressions at difficult parts of the words.

14. Hendrickson and Peckstein (18) verified Tidyman's (33) theory that there is a relation between certainty of judgment and accuracy of spelling. Each subject marked his spelling of each word as "correct," "incorrect," or "doubtful." Seventy-two and five-tenths per cent of the judgments were correct; twenty-four and seven-tenths per cent were incorrect; and two and eight-tenths per cent

were "doubtful judgments." Judgments of correctness was more accurate than judgment of incorrectness. Accuracy of judgment correlated $+0.68$ with accuracy of spelling.

15. Archer (2, 3) found more positive than negative transfer when the base form of words is learned as compared with the derivatives ending in -s, -ed, and -ing. Holsopple and Vanouse (22) found practice of "incorrect spelling" to be more effective in learning to typewrite than the practice of correct spelling. Wallin (36, 37) found evidence of transfer from column drill to composition spelling.

Excellent bibliographies, which, however, emphasize testing methods more than psychological factors, were published by Horn (25), Foran and Rock (13), and Sisters M. Irmina, M. Visitation, and M. Gabriel (28).

At the present time the following factors seem to have important influence upon spelling ability:

1. *Span of apprehension* (visual and auditory).
2. *Knowledge of meaning* of words in a given spelling list.
3. General *verbal intelligence* (if it be actually differentiated from 4, 5, and 6 below).
4. *Skill in detecting the essential features of word-form* (visual and auditory perception).
5. Skill in associating phonetic units with the prescribed written units (generalization or logical memorizing).
6. Practice and drill in associating the letters of words in their correct order (rote memorizing).
7. A genuine desire to learn to spell and the recognition of its importance for academic and cultural development.

BIBLIOGRAPHY

1. ABERNETHY, E. M., Photographic Records of Eye-Movements in Studying Spelling. *J. Educ. Psychol.*, 1929, 20, 695-701.
2. ARCHER, C. P., Transfer of Training in Spelling. *Elem. Eng. Rev.*, 1928, 5, 55-61.
3. ——— Transfer of Training in Spelling. *Univ. Iowa Stud.: Stud. in Educ.*, 1930, 5, No. 5, p. 63.
4. AYRES, L. P., *A Measuring Scale for Ability in Spelling*. Russell Sage Foundation, Division of Educ., N. Y., 1915, 38-39.
5. BAWDEN, H. H., A Study of Lapses. *Psychol. Rev. Monog. Suppl.*, 1900, 3, 1-120.
6. BOOK, W. F., How a Special Disability in Spelling Was Diagnosed and Corrected. *J. Appl. Psychol.*, 1929, 13, 378-393.
7. CARMEN, E. K., The Cause of Chronic Bad Spelling. *J. Pedagogy*, 1900, 13, 86-91.

8. CARROLL, H. A., Generalization of Bright and Dull Children. A Comparative Study with Special Reference to Spelling. *J. Educ. Psychol.*, 1930, 21, 489-499.
9. ——— Generalization of Bright and Dull Children. A Comparative Study with Special Reference to Spelling. *Teachers College Contrib. to Educ.*, 1930, No. 439.
10. ——— The Effect of Intelligence upon Phonetic Generalization. *J. Appl. Psychol.*, 1931, 15, 168-181.
11. COBB, M. E., KINCAID, M., and WASHBURN, M. F., Further Tests of Verbal Ability of Poor Spellers. *Amer. J. Psychol.*, 1918, 29, 331-332.
12. EARLE, E. L., Inheritance of Ability to Learn to Spell. *Columbia Univ. Contrib. to Philo., Psychol., and Educ.*, 1902-1903, 11, No. 2, 41-46 (147-152).
13. FORAN, T. G., and ROCK, R. T., An Annotated Bibliography of Studies Related to Spelling. *Catholic Univ. Amer. Educ. Res. Bull.*, 1930, 5, No. 1, 24-111.
14. GATES, A. I., The Psychology of Reading and Spelling. *T. C. Columbia Univ. Contrib. to Educ.*, 1922, No. 129, 93-94.
15. ——— A Study of the Rôle of Visual Perception, Intelligence, and Certain Associative Processes in Reading and Spelling. *J. Educ. Psychol.*, 1926, 17, 433-445.
16. GATES, A. I., and CHASE, ESTHER H., Methods and Theories of Learning to Spell Tested by Studies of Deaf Children. *J. Educ. Psychol.*, 1926, 17, 289-300.
17. HARTMANN, J. W., The Relative Importance of Visual and Auditory Factors in Spelling Ability. *J. Educ. Psychol.*, 1931, 22, 691-699.
18. HENDRICKSON, G., and PECKSTEIN, L. A., Spelling Consciousness of College Students. *J. Educ. Psychol.*, 1926, 17, 37-44.
19. HOLLINGWORTH, L. S., *Special Talents and Defects*. Macmillan, 1923, 98-100.
20. ——— The Psychological Examination of Poor Spellers. *T. C. Record*, 1919, 20, 126-132.
21. ——— The Psychology of Special Disability in Spelling. *T. C. Columbia Univ. Contrib. to Educ.*, 1918, No. 88, vi-105.
22. HOLSOPPLE, J. Q., and VANOUSE, I., A Note on Beta Hypothesis of Learning. *Sch. and Soc.*, 1929, 29, 15-16.
23. HORN, E., A Source of Confusion in Spelling. *J. Educ. Res.*, 1929, 19, 45-55.
24. ——— Influence of Past Experience upon Spelling. *J. Educ. Res.*, 1929, 19, 283-288.
25. ——— Principles of Method in Teaching Spelling Derived from Scientific Investigations. *Nat. Soc. S. Study of Educ.*, 18th Year Book II, 1919, 52-77.
26. HOUSER, J. D., Relation of Spelling Ability to General Intelligence and to Meaning Vocabulary. *Elem. Sch. J.*, 1915, 16, 190-199.
27. HOWELL, A., HOBSON, L., and WASHBURN, M. F., Accuracy of Visual Memory and Speed of Verbal Perception in Poor Spellers. *Amer. J. Psychol.*, 1917, 28, 157-159.

28. IRMINA, SISTER M., VISITATION, SISTER M., and GABRIEL, SISTER M.,
An Annotated Bibliography of Studies Relating to Spelling. *Catholic Univ. Amer. Educ. Res. Bull.*, 1928, 3, No. 1, 3-56.
29. KIEFER, F. A., and SANGREN, P. V., Experimental Investigation of the
Causes of Poor Spelling Among University Students with Suggestions
for Improvement. *J. Educ. Psychol.*, 1925, 16, 38-47.
30. MENDENHALL, J. E., The Characteristics of Spelling Errors. *J. Educ. Psychol.*, 1930, 21, 648-656.
31. OMWAKE, K. T., Relation of Abstract Intelligence to Ability to Spell.
Pub. Personnel Studies, 1925, 3, 197-301.
32. PRESSEY, L. C., An Investigation Into the Elements of Ability to Spell.
Educ. Res. Bull., 1927, 6, 203-204.
33. TIDYMAN, W. F., Do Elementary School Pupils Know When They Make
Mistakes in Spelling? *Sch. and Soc.*, 1924, XX, 349-350.
34. TRAVIS, L. E., Mental Conflict as the Cause of Bad Spelling and Poor
Writing. *Psychoanalytic Rev.*, 1924, 11, 175-181.
35. VISITATION, SISTER M., Visual Perception in Reading and Spelling: A
Statistical Analysis. *Catholic Univ. Amer. Educ. Res. Bull.*, 1929, 4,
No. 4, 1-47.
36. WALLIN, J. E. W., *Spelling Efficiency in Relation to Age, Grade, and Sex,
and the Question of Transfer*. Baltimore: Warwick and York, 1911,
65-76.
37. ——— Has the Drill Become Obsolescent? A Preliminary Discussion,
Particularly with Reference to Spelling. *J. Educ. Psychol.*, 1910, 1, 200-
213.
38. WILLIAMSON, E. G., The Relation of Learning to Spelling Ability. *J. Educ. Psychol.*, 1933, 24, 257-265.
39. WITMER, L., A Case of Chronic Bad Spelling. *Psychol. Clinic*, 1907, 1,
53-64.

A REVIEW OF EXPERIMENTS ON HUMOR

BY RUTH EASTWOOD PERL

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Although theories of humor and the comic are legion, (1, 2) most of them are based on no experimental work whatsoever. The writer here attempts a survey of the *experimental* work available in this field in the hope of forming a background for future experiments and a basis for theorizing.

Since most of the experiments touch upon small and entirely unrelated aspects of the topic, it will perhaps be best not to attempt to group them, but to present them in chronological order.

The first research to be reported in the field of humor is one by G. Stanley Hall and Arthur Allin (3) which was published in 1897. They received about 3,000 responses to a questionnaire sent out requesting a description of all situations which individuals considered humorous, and including questions on tickling and its effects at various ages, causes of laughter in children, laughter in animals, fun in the theater, spontaneous laughter, laughter at calamities, and the best joke in each class, including puns, repartee, practical jokes, etc.

Then they classified laughs, gave a resumé of theories of laughter, and concluded that all the current theories were inadequate and speculative, but that there are few more promising fields for psychological research than that of humor.

There were no further experiments on our topic reported until 1905 when L. J. Martin (4), studying the psychology of aesthetics, published an article, "Experimental Prospecting in the Field of the Comic." Her material was largely composed of pictures. She used 3 methods.

The first of these was undirected introspection. From this she concluded that a smiling face or an animal in a picture suggests funniness even if the picture in other respects is not humorous. She found a carry-over of humor from one picture to the next. A person's judgment of humor is greatly influenced by his physical condition. She also noted that on repeated seeing, pictures get stale, trite, and even cause a feeling of unpleasantness.

She next conducted an experiment applying psycho-physical

methods. There were 3 subjects who ranked 40 pictures and 2 who ranked 26 pictures into 6 classes, and divided each class into 3 groups characterized by their funniness. Her results show that judgment depends in part upon the length of time the pictures are exposed. The degree of funniness and the fun duration vary directly with the complexity of the pictures or the number of fun centers in each. She found fun fatigue for a long series and fun accumulation for a short one. There was also an element of suggestion demonstrated here, as a sad fore-picture or sad music made funny pictures seem less funny. X

Her third method was one of directed introspection carried on by means of a questionnaire. The most impressive conclusion here was that laughter and funniness go hand in hand, and that restraining the laughter decreases the feeling of fun. (Perhaps this could be tied up with the James-Lange theory of emotions.)

H. L. Hollingworth (5) was the next to make a study of humor. In the following manner he explains the fact that only two experimental studies of humor had been made up to the time of his paper: "Reactions to comic situations are notoriously dependent on individual temperament, mood, and circumstances. So much is this true that few attempts to control these variable factors experimentally or to measure in any way the subjective element in the response to the comic have been reported." (5, page 132.) X

The variables to be considered can be divided into two classes. There are variables in the observer due to experience, present attitude, emotional complexes, even racial differences. And the variables in the comic situation included speed of presentation, number of repetitions, and degree of adaptation that has taken place.

Hollingworth's procedure was to have 10 subjects each arrange 39 jokes into 10 piles according to funniness. The order of merit was computed from these averages. Each subject arranged the joke cards 5 times, each arrangement a week apart.

The problems considered were of three sorts; first, judgment of the comic, including individual differences, variability of the same subject from time to time, average variability of one observer compared with that of the group, correlation of consistency with agreement with group average, relation of quality of motivation to variability; secondly, psychology of adaptation to the comic, including decrease in fun with repetition, relative decrease in fun among various types of jokes, and waxing, waning, and static jokes; and thirdly, contributions to theory.

Hollingworth found that four distinctions of merit are all that can accurately and comfortably be made by groups or individuals when judging jokes. In the beginning people agree more closely on the good than on the poor jokes, but with repeated presentation this difference disappears. However, the same individual is, on the average, more certain of judgments in the lower section than in the upper one of the list. There is nothing to indicate that an individual whose judgments are variable in one experiment will be variable in another, but there is an indication of correlation of judicial capacity on different materials, meaning that an individual whose judgments are most nearly an index of the opinion of his group in one case, is somewhat more likely than any other to be the best judge out of the same group when considering other material.

Hollingworth points out that individuals whose personal consistency is least in judgments of humor, correlate most closely with the group. This is explained by the existence of waxing and waning jokes. Upon repetition, the funniness of the list as a whole falls, but the relative positions of the jokes change. The waxing jokes are the objective ones, particularly the naïve ones and the calamity jokes in which the predicament is self-induced. The waning ones are the sharp retort, the pun, the play on words, wit, caricature, and occupational jokes. These are waning because, on repetition, the subjective deception is no longer forthcoming. The category of static jokes is mixed, the effect being caused by the subjective and objective elements in combination or contradiction.

These results, according to Hollingworth, point to a theory suggesting that the comic is the success of a trick as play activity, and that there is an objective-comic and a subjective-comic comparable to waxing and waning jokes.

Walker and Washburn (6) used the Healy-Fernald Picture Completion Test as a test for the perception of the comic. For each of the vacant squares on the board 3 picture squares were selected. One of these was the appropriate one which logically completed the picture; one formed a merely incongruous combination with the picture; one was intended to appeal, by an element of appropriateness in the midst of incongruity, to a more intellectual sense of humor. The observers rated these on a 5 point scale, trying to indicate which of the 3 completions gave the most humorous picture. Eighty young women college students, 18 seventh grade boys and girls, and 18 fourth grade boys and girls acted as subjects.

The intensity of the reaction to the comic was greatest in the

fourth grade children and least in the adults. The pictures in their appropriate context were funnier to the fourth grade children than to the other groups. Mere incongruity, however, was decidedly funnier to seventh grade children than to either fourth grade children or adults.

Scofield (7) studied the effect of jokes and pictures. The subjects were tested individually to avoid the effect of group laughter. Her method was a combination of a modified order of merit with a rating scale. She had a group arrange the jokes into 3 piles and then work over them again until there were 10 classes in all. From this a scale analogous to Thorndike's handwriting scale was made, containing 10 jokes varying in equal steps from most funny to least funny. These her subjects ranked on a 4 point scale before making them over into an order of merit series. The group agreed most closely on the best and worst jokes and pictures.

She then tested the subjects' breathing and found that the final respiration value, taking into account frequency and intensity, was greatest for forced laughter, next for pictures, next for normal breathing, and lowest for jokes, due, perhaps, in this last case, to thought, which is supposed to inhibit normal respiration. Scofield also found that the reaction time for jokes was longer than for pictures, and asserted that the longer the period of preparation the less hearty is the laughter.

"Variations in the Sense for Humor According to Age and Mental Condition," by Mary St. Clair Hester,(8) is next to be considered. First, she asked a group of preschool age children to tell the funniest thing they knew. The surprise element ranked highest. Physical situations and calamities were also prevalent.

Girls seven to ten years of age were then asked to do the same. With them, too, physical situations and calamities prevailed. Suggestion played a large part here, as one member of the group asked if she might use a joke about a banana skin and, it seems that as a result, many children gave jokes about banana skins. The play on words does not appear as a type of joke in children under ten.

A group of college girls were asked not only to tell the funniest thing they knew, but also to grade, on a 5 point scale, a list of 40 jokes ranging from good to bad and representative of various types of humor. Naïve jokes ranked highest here. She found that a sense of humor among normal persons is unrelated to intelligence.

The same list of jokes was presented orally to a group of insane people. The examiner had to interpret the responses. The rank

order correlation for humor judgments between the normals and the insane was $+.51$. The normals showed greater standard deviation in rating than the abnormals. Many more jokes were graded as not at all funny or very poor by the insane than by the normal subjects. This may perhaps be explained by other factors than sense of humor, such, for example, as lack of insight, no judgment, low emotional state, or an unusual conception of a joke entering into the rating.

A study was made at Vassar by P. Kambouropoulou (9) on "Individual Differences in the Sense of Humor." In her first experiment 70 students kept laughter diaries for one week, in which they recorded all incidents which caused them to laugh during that time. She then gave them lists of jokes to be ranked, in order to see if people remained true to type. She found her subjects to be fairly consistent.

Causes for laughter were classified as follows:

- A. No objective cause, just a pleasant situation or other people laughing.
- B. Objective physical cause.
- C. The objective cause is the mental inferiority of another.
- D. Wit, personally directed at another's mental inferiority, etc.
- E. Incongruity in situations.
- F. Incongruity in ideas.

Omitting A and B, the physiological laughter and the laughter based on an objective physical cause, humor may be divided into two types: (1) Personal, including both C and D, *i.e.*, passive and directed; and (2) Impersonal, including E and F, *i.e.*, situations and ideas. Class C predominates as a cause for laughter; A and B are without humor, and the tendency to laugh only with no objective cause, correlates negatively with academic standing. Mentality bears no relation to the personal and impersonal types of humor, except that subjects of better academic standing tend to enjoy the nonsense jokes, F, more than do the other subjects.

In her later study Kambouropoulou (10) analyzed 100 laughter diaries, getting very similar results. She then related personality traits to preferences in the diaries and found that a greater degree of extroversion goes together with the greater proportion of the superiority class of laughter. Of the extrovert traits, she found that greater confidence in social intercourse agrees with the greater proportion of superiority laughter better than does amount of sociability. In testing the subjects' memory for jokes she noted that the jokes that are considered funniest by an individual are remembered

by that individual, but that funniness is not the only factor for recall. She also found that a high rating in sense of humor tends to be given by friends to extroverts and seems to be related to the measures to which extroversion is related.

"A Statistical Analysis of Crowd Laughter" was made by Florence Lange (11). This is a study of crowd reaction to humor in the theater. At four performances of "Iolanthe" in the summer of 1926, laughter was checked with a stop-watch, to see how different audiences at a professional theatrical performance agree. She found that there was never a variation of more than one second for the four audiences for each laugh. (This seems to prove little more than that the distribution curves of the personality traits of people who go to see "Iolanthe" are similar, *i.e.*, the four audiences are four similar homogeneous groups.) Encores of songs showed no loss in laughs, but each laugh was cut in half in duration. All humor, except one slap-stick bit, caused laughter under ten seconds in length. After this one hilarious moment, the crowd loosened up, and the laughter scores were higher than before. No variation was found due to the day of the week.

Amateur theatrical laughs were found to be less constant. It is difficult for amateur producers to anticipate the true comic. Surprise situations and accidents cause unforeseen laughs. Then, also, the actors forget to wait for the laughs to fit in, etc. She noted that the duration of the laughter tends to increase in direct proportion to the practice of the actors.

Lange next compared her results from professional dramatic performances with Kambouropoulou's results from laughter diaries. Using the latter's classification, Lange found dramatic laughter reactions in order of frequency to be B, E, C, D, F, A, in contrast to Kambouropoulou's daily life frequency order of C, B, E, D, F, A.

And finally, Lange made a study of the relative contributions of words, costumes, and business to funniness. The comic song, "I Certainly Must Be in Love," was presented by a professional entertainer to a high-school audience under varying conditions including (a) using the words alone, (b) words and costume, (c) words and business, and (d) words, costume, and business. It seems that costumes enhance the funniness by 100 per cent, business by 400 per cent, and together they enhance the funniness by 600 per cent.

Herbert Barry (12) at Harvard studied "The Rôle of Subject Matter in Individual Differences in Humor." He used only two subjects, graduate students, who were asked to rate jokes according

to humorousness. He found that different types of jokes were marked funny by each subject. Subject A appreciated jokes about violence, while other types of jokes, especially alcoholic ones, appealed to subject B. Then he asked his subjects each to pick the funniest passage from a portion of a book. Here his results gave evidence of the same trend. He asked subject A to give his past experience in connection with violence. He next gave his subjects a free association test of the type popularized by Jung, and found that violence stimuli brought out faults, inability to respond, etc., in the case of A and not for B. This and the "ausfrage" method confirmed Barry's suspicion that in A there was a "violence Constellation," including especial enjoyment of jokes dealing with this topic, indications of affective tone when reacting to stimulus words of violence, and strongly conditioned experiences which could be referred to the same topic. Jokes about cold or singing were especially funny to A also, and show that the correlation between emotion and humor is not confined to fighting and its sub-topics.

These dislikes and emotional attitudes were not so well defined in B. His response to alcoholic jokes seemed to be based on sympathy and fear, as was shown by his reaction to superiority and degradation types of jokes. The results with B show that the generalization about consistency, as observed for A, is not limited to one subject.

Barry concludes that there are marked individual differences in the appreciation of humor. Humor may be classified into topics according to meaningful content. Topics capable of eliciting a humorous reaction in an individual seem to be frequently loaded for that individual with an unpleasant emotional affect. It seems probable that humor is due to the change of the affective tone of the original perception from unpleasant to neutral or pleasant. The perception of the unreality in the situation is what causes a thing heavily loaded with emotion to become humorous. The incongruity or suddenness seems to be an incidental rather than a primary factor. Barry also noted that introspections on this matter tend to be especially unreliable because of the regression induced by the unpleasant component of the perception and also because of a tendency to rationalize.

The next paper to be discussed is an observational study by Alice Gregg (13). She observed 22 children three years of age, at the Institute of Child Welfare Research, for a period of 40 hours, spread over 3 months. The observations were not complete because of

obstacles in the technique and because of the human frailty of the observers, but Gregg estimated that the report gave three-fifths of all the laughter during that period.

She found that 93 per cent of all laughs occurred when the children were in groups. Most of the 7 per cent that occurred alone was in connection with some movement. In fact, motion entered into 73 per cent of all laughs, sound into 13 per cent, incongruousness into 12 per cent, self-achievement into 6 per cent, and stories and pictures into 4 per cent. This adds up to more than 100 per cent because of overlapping and duplication.

She then computed laughter indices, the ratio of the number of laughs to the number of laughing situations. There were great individual variations, the range being from 48 to 96. Gregg concluded that laughter is more a matter of temperament than I.Q. The correlation of laughter indices with results on the Kuhlmann test was $-.21$. A correlation of $-.72$ was obtained between laughs and smiles, which seem to merge into each other. Laughter far outdistances comic perception in children. Also, laughter does not equal the pleasurable; children often are much pleased, and yet do not laugh.

Samuel Allentuck (14) studied the "Effect of Suggestion on Humor." He compared an experimental (suggestible) group and a standard group in rating jokes. The jokes were presented from least to most funny, and the amount of humor was graded by the length of line drawn to represent it. The fact that the experimental group was unusually suggestible was demonstrated by various means, such as the pupillary reflex, hand clasping, eye opening, the Otis Suggestibility Test, and sugar tablets given with the suggestion that they would disturb sleep, which sleep disturbance was then reported in every case by the suggestible subjects.

The experimental group and the standard group ratings of jokes were almost the same when the experimental group was in normal condition. Even when the experimental group had been put in a suggestible state by carrying out suggestions in the pendulum swinging and falling backward performances, its judgments did not differ from those of the standard group. But, when positive suggestions of humor were given to the experimental group in its suggestible state, this group showed large differences from the standard group. Also, the individual differences of the suggestible group in the suggestible state and with positive suggestions of humor, lessened greatly.

Ruth Perl (15) studied "The Influence of Social Factors Upon

the Appreciation of Humor." In a preliminary experiment, 3 lists of jokes were statistically equated in funniness. These 3 lists were then presented to a group of 40 graduate students, to be graded on a 5 point scale under various conditions. One list was presented in mimeographed form, and the subjects took these home to grade in private. Another list was read to the subjects as a group while they graded them. The third list was presented to the group visually by means of a lantern and slides.

The jokes presented to the group visually were judged to be funnier on the average than those jokes rated privately. This difference was statistically reliable. The jokes presented visually seemed to be funnier than the jokes presented vocally, at least under the conditions of the experiment which included telling the jokes in a rather uniform and straight-faced manner. Jokes rated in private seemed least funny. Social facilitation seemed to have relatively more influence in raising the scores of the poor jokes than it had in raising the scores of the good ones.

Landis and Ross (16) investigated "Humor and Its Relation to Other Personality Traits." Their purpose was to study individual differences in rating and classifying jokes when these jokes were presented in standard fashion. They devised a so-called humor test, realizing, however, that this was not a measure of a sense of humor. Thirty jokes illustrative of each of 7 categories (humor of quantity, of incongruity, of the unexpected, of truth, of superiority, of repression, and of the ridiculous) were chosen so that 3 readers unanimously agreed that each joke was clearly an instance of only one category. These jokes were rated for goodness by writers and editors of college humorous publications. From each group of 30 jokes, 12 were selected, 3 very good, 3 good, 3 poor, and 3 very poor; and 16 other jokes, including 9 used by Kambouropoulou, were added to make a list of 100. The subjects' task was to rate these jokes on a 5 point scale and also to indicate in which of the 7 categories each of the jokes belonged.

Heidbreder's revision of Freyd's Introversion-Extroversion scale was used. Intelligence scores were derived in different ways for different groups of subjects. The subjects were 124 male undergraduates at Wesleyan, 154 female undergraduates at Smith, and 112 delinquent girls under twenty-one years of age at a Connecticut state institution.

There seem to be no significant relations between the scores on the humor, personality, and intelligence tests. However, more intelligent subjects rated jokes in the incongruous and truth categories

higher. The introverts used and valued the repression category (having to do with fear, sex, etc.), while the extroverts used and valued the truth category (exposure of unrevealed thoughts, and the like). Men valued jokes slightly but significantly higher than women of the same age and social status. The authors suggest that the fact that the jokes were originally picked by men may have had something to do with this. The judgments which assign the jokes to various categories of humor reflect differences in performance between individuals, between different social groups, and between sexes.

An examination of the techniques used in these various experiments might be in order. It is seen that ranking and rating methods are used extensively, some time in connection with questionnaire, diary, physiological, observational, or other methods, and often by themselves. However, there is no uniformity in the procedures that have been employed, some experimenters using the order of merit, some a 3, 4, or 5 point scale, and some a graphic rating scale.

A great deal of discussion of rating methods has appeared in the literature, but most of the work has been on rating people in traits rather than rating ideas or jokes. Some feel that there is no significant difference between results obtained by scales which demand that the rater shall rank items in order of merit and scales which provide a range of values which may be assigned to the items.¹ However, some psychologists feel that rating scales are valid according to the degree to which they approach the order of merit in principle,² while others³ think that the order of merit makes distinctions which are finer than necessary or possible in a large group, that it gives no framework on which to hang judgments, and that, unless statistical corrections are made, it assumes that a unit difference in rank always indicates a constant difference in the thing measured.

Symonds⁴ thinks that a 7 point scale is the optimum. Fewer classes cause a loss of reliability due to coarseness, while more classes or a graphic scale, as discussed by Freyd⁵ or used by Allentuck, requires discrimination which does not yield an increase in reli-

¹ See G. B. WATSON, A Supplementary Review of Measures of Personality Traits. *J. Educ. Psychol.*, 1927, 18, 73-87.

² For example, A. T. POFFENBERGER, *Applied Psychology*, 1927, p. 288.

³ See BINGHAM and FREYD, *Procedures in Employment Psychology*, 1926, 123-124.

⁴ P. M. SYMONDS, On the Loss in Reliability in Ratings Due to Coarseness of the Scale, *J. Exper. Psychol.*, 1924, 7, 456-461, and Notes on Rating, *J. Appl. Psychol.*, 1925, 9, 188-195.

⁵ M. FREYD, The Graphic Rating Scale. *J. Educ. Psychol.*, 1923, 14, 83-102.

bility sufficient to make the increase in steps worth while. Hollingworth, in his work on judgment discussed above, found that for different subject matters, different degrees of distinction could be accurately and comfortably made. He concluded that four distinctions of merit were optimum when rating jokes.

Then, also, if, as Hollingworth has shown, some jokes wax and others wane with repetition, rating or ranking techniques, such as Scofield's, for example, which require working over the jokes a second or third time, are not permissible.

It is difficult to sum up results as so many aspects of humor have been touched upon. It has been observed that many different types of statements, anecdotes, and situations have been considered funny, and these have been classified depending upon their appeal. Tremendous individual differences have been found. Neither intelligence nor personality type seems to be closely connected with appreciation of humor in general, but categories of jokes that are preferred seem to be influenced by these factors. College students appreciate naïve jokes or those based on the mental inferiority of another, while the surprise element ranks high with children. Extroverts prefer jokes based on superiority or the exposure of unrevealed thoughts, while introverts prefer jokes having to do with repressions such as fear or sex. Individual differences in affective tone and emotional connections influence judgments of humor. Physiological states seem to influence and be influenced by humor. Suggestion, no matter whether given to suggestible persons in the form of positive suggestions of humor or given to normal subjects by the social facilitation in a group situation, seems to play an important part in judgments of humor.

It is obvious that just a meager start has been made in investigating the psychological problems connected with humor and the comic. Methods must be devised to overcome the difficulties inherent in these problems, difficulties that work on humor has in common with all experimental aesthetics. Woodworth and Poffenberger,⁶ speaking of experimental aesthetics, say, "The methods used in this field are fundamentally the same as those used in psycho-physics with two important modifications, first, there is no objectively determinable fact in aesthetics by reference to which the correctness of a judgment can be gauged, and, second, it is usually if not always impracticable to require the subject to make repeated aesthetic comparisons

⁶ R. S. WOODWORTH and A. T. POFFENBERGER, *Experimental Psychology*, typewritten Manuscript in Psychology Reading Room, Columbia Univ., p. 254.

of the two objects, because the memory of previous judgments would interfere with the spontaneity of the succeeding judgments, and because the aesthetic effect of an object evaporates or is even reversed with often repeated contemplation of it."

BIBLIOGRAPHY

1. DISERENS, C. M., and BONIFELD, M., Humor and the Ludicrous. *Psychol. Bull.*, 1930, 27, 108-118.
2. DISERENS, C. M., Recent Theories of Laughter. *Psychol. Bull.*, 1926, 23, 247-255.
3. HALL, G. S., and ALLIN, A., The Psychology of Tickling, Laughter and the Comic. *Amer. J. Psychol.*, 1897, 9, 1-42.
4. MARTIN, L. J., Psychology of Aesthetics, Experimental Prospecting in the Field of the Comic. *Amer. J. Psychol.*, 1905, 16, 35-118.
5. HOLLINGWORTH, H. L., Experimental Studies of Judgment of the Comic. *Psychol. Rev.*, 1911, 18, 132-156.
6. WALKER, M. A., and WASHBURN, M. F., The Healy-Fernald Picture Completion Test as a Test of the Perception of the Comic. *Amer. J. Psychol.*, 1919, 30, 304-307.
7. SCOFIELD, H. A., *The Psychology of Laughter*. Columbia University Unpublished Masters Essay, 1921, 1-66.
8. HESTER, M. St. C., *Variations in the Sense for Humor According to Age and Mental Condition*. Columbia University Unpublished Masters Essay, 1924, 1-53.
9. KAMBOUROPOULOU, P., Individual Differences in the Sense of Humor. *Amer. J. Psychol.*, 1926, 37, 268-278.
10. KAMBOUROPOULOU, P., Individual Differences in the Sense of Humor and Their Relation to Temperamental Differences. *Arch. Psychol.*, 1931, 121, 1-83.
11. LANGE, F. E., *A Statistical Analysis of Crowd Laughter*. Columbia University Unpublished Masters Essay, 1927, 1-32.
12. BARRY, H., The Role of Subject Matter in Individual Differences in Humor. *J. Gen. Psychol.*, 1928, 35, 112-127.
13. GREGG, A., *An Observational Study of Laughter in Three Year Olds*. Columbia University Unpublished Masters Essay, 1928, 1-58.
14. ALLENTUCK, S., *The Effect of Suggestion on Humor*. Columbia University Unpublished Masters Essay, 1929, 1-60.
15. PERL, R. E., The Influence of Social Factors Upon the Appreciation of Humor. *Amer. J. Psychol.*, 1933, 45, 308-312.
16. LANDIS, C., and ROSS, W. H., Humor and Its Relation to Other Personality Traits. *J. Social Psychol.*, 1933, 4, 156-175.

BOOK REVIEWS

BORING, EDWIN G. *The Physical Dimensions of Consciousness*. New York and London: The Century Co., 1933. Pp. xii+251.

In the reviewer's opinion this brief, closely reasoned and closely written book is one of the most significant and challenging contributions to theoretical psychology that has appeared in recent years. The volume's very compactness of style makes it peculiarly difficult to review. Were the reviewer to try to give an adequate summary of the contents of the book and at the same time evaluate and attempt to criticize in detail some of its arguments, he would himself require a book for the work. He therefore presents this review with full knowledge of its inadequacy. The thesis of the volume will first be briefly summarized, chapter by chapter, after which a series of possible criticisms of the work will be presented.

The Cartesian dichotomy of mind and body is historically and critically considered in the first chapter. Here the formula of Avenarius, adopted by Külpe and Titchener, that psychology "deals with experience regarded as dependent upon the experiencing individual, while physics deals with independent experience," is acutely criticized. Similarly, the view that the subject matter of psychology is direct experience, or phenomenology, is shown to be untenable from the author's point of view. On the basis of an argument similar to that of the author's previous paper on the "Psychologist's Circle," both of these views are finally abandoned. In their place positions are taken which are fundamental in an understanding of the rest of the book. First of all it is asserted that "*whatever exists as reality for psychology is a product of inductive inference.*" That is, psychology deals with constructs which are realities in the sense that the atom is a construct and at the same time a scientific reality. Using such logical constructs built up from conscious experience the author then turns to show that in his opinion these constructs are to be fitted into a closed causal system which also involves stimuli and brain processes. This relationship is effected by a special use of the logic of correlation. It is asserted that if a perfect correlation can be shown to hold between sensation "A" and brain process "a," there would be identity. In other words, the conceptual psychological event and the conceptual neural event are potentially identifiable if they are per-

fectly correlated. Thus he believes that increase in knowledge about the nervous system would directly contribute to the knowledge of the conscious entities and introspection directly contribute to physiology.

In the second chapter the current psychological theories in regard to mental elements and their attributes are considered. The position is taken that historically sensationism has triumphed in the descriptive psychology of experience and that now a dimensional view of sensory consciousness is to be adopted. This doctrine of conscious dimensions may, the author suggests, be thought of as "essentially Titchener's way of meeting the challenge of Gestalt psychology." Certainly the idea of the "conscious dimension" seems to be a further logical development of the concept of "attribute" as that concept was used by Titchener in the *Text-book*. Boring holds that these dimensions are scientifically arbitrary and temporary, matters of convenience rather than entities to be discovered. These dimensions are conceived of as continua upon which, in a manner, may be displayed a complete psychology. "We have nothing to seek further," the author says, "than the full account of mental organization in respect of these dimensions." The four dimensions which are to be considered in detail in the volume are quality, intensity, extensity, and protensity. The dimension "attensity" of Titchener has been abandoned. The general task of the book is thus formulated as the development of a physiological psychology of the dimensions of consciousness in the light of a correlation of the constructs of physical, neurological and experiential science. The next four chapters deal respectively with these four major dimensions. The material that would have been subsumed under the heading of "clearness" or "attensity" is dealt with in a section on attention.

In the chapter on intensity the author, on the basis of the prolegomena just given, plunges directly into a review of the modern electrophysiology of the nerve impulse. Here he summarizes the current experimental work in the field in a brief but masterful way. He first considers the general time relations of neuron activity and then discusses the relationship between these phenomena and the membrane theory of neuron conduction. On the basis of the all-or-none law, the multiple-fiber theory and the frequency and volley theories of neural intensity are then considered. Strong evidence is presented favoring, in certain sense-fields at any rate, the volley theory in something like the form in which it has been presented by Wever and Bray. An effort is also made to show how this theory may be made to coincide with certain of Lashley's conclusions in

regard to cerebral physiology. Intensity, then, is thought of not exactly as a space-time summation in the brain but rather as "a single resultant that is a function of the total excitation in a limited number of adjacent fibers in a limited time."

The chapter on extensity begins with a consideration of the history of the psychological problems of space by referring briefly to the view of Müller, Lotze, Hering, Stumpf, Wundt, Külpe, Titchener, Wertheimer, Koffka, and others. The conclusion is accepted that "organized extensity is phenomenally given," and that "thus nativism seems to have triumphed as to the capacity to perceive spatial form in respect of its internal relations, although geneticism may still account for many phenomena of localization." The relation of this conclusion to cortical projection theories is then considered. Bernstein's "naïve projection theory" is first discussed. The fact is emphasized that this theory holds that the pattern of central excitation is like the perceptual pattern yielded by introspection. Evidence in favor of a modified projection theory is brought together from vision, the skin senses, and the auditory field. The author's previously proposed theory in regard to returning skin sensitivity is reviewed in this connection. It will at once be apparent that a modified treatment of the Bernstein theory of the sort just outlined may be considered as a preparation for the Gestalt concept of isomorphism. This conception, in so far as it has bearing upon the problem of psychophysical correspondence, is then considered. The criticism of Gestalt psychology is made that in the principle of isomorphism the Gestalt theory is at once involved in "the constancy hypothesis" and in "naïve dualism." On the basis of this criticism Boring proposes a view which holds that the spatial pattern of stimulation at the periphery is preserved in the brain in such a way that it is not a reproduction but a function of the spatial order as given in the receptor surfaces. This relationship is held to be basic to the specific activations which occur at the brain which is considered, therefore, in this sense, and thus certainly to the surprise of many psychologists, as "the seat of consciousness." Extension is dealt with as distinct from space and is given special consideration in relation to current theories of brain physiology and Köhler's "electrostatic fields." Each of the relevant senses is considered in relation to extension, and the part played by surrogates from the other sense-fields in such experiences is considered. A clear view of the present status of the psychology of tonal volume, the visual third dimension, size, and form is then presented. The last pages of this chapter are devoted to a

consideration of the cerebral basis of spatial localization. The problem of the visual optical illusions is dealt with in terms of a dynamical projection theory in which no explicit consideration is given to the motor response of the organism nor to the theories which consider the possibility of this factor in dealing with the illusions. The treatment as given leads to a still more detailed review of Lashley's work on the brain of the rat. Boring interprets this work in the following paragraph:

"In the first place, it is clear that we are in the presence of something like a hierarchy of functions in respect of equipotentiality and specificity of localization. At an upper level is intelligence, as measured by ability to learn a maze. It is dependent upon the mass action of the entire cortex and all parts of the cortex are equipotential in respect of it. Then at a lower and more specific level there is the perception of spatial form. It depends upon mass action of equipotential parts of the lateral portion of area *w*. Insult to any other part of the cortex leaves this function unaffected. Then, presumably at a third level, there is the gross perception of objects and their position, without discrimination of pattern or form. This function depends upon the optic radiations from the internal capsule to the cortex, but persists with the complete destruction of area *w*. Finally, at the lowest level, there is the visual discrimination of brightnesses, which persists when the optic radiations are interrupted, but would be abolished at some still lower level. This discrimination occurs to the total brightness of a field, for there can be no perception of pattern or even of gross form when the optic radiations are interrupted."

On the ground work of this physiology the conclusion is drawn that perception of visual form depends upon an approximately localized region of the cortex, but that within this region there is no necessary further specific localization. In interpreting this view it must not be forgotten that the conclusions are based upon experiments on the rodent brain. From such data as the "tendency" of certain forms to become circular, an idea of the organization of form in the cortex may eventually be secured, it is suggested. Spatial localization is then considered largely in cerebral terms, although the point is made that there are some lower orders of localization which are in the nature of motor responses.

Extensity is thus held to be related to spatial organization in the brain. Boring himself summarizes this view as follows: "There can be no exact projection, but there must be a correspondence of spatial orders, except where perception is inadequate or illusory. Quite possibly this organization is sometimes tridimensional. Apparently its form is more definitely determined by the stimulus than its size, and its locus is only roughly guaranteed by the stimulus within certain approximate limitations of projection."

Chapter five is devoted to the psychophysiological characteristics of time. Here the history and the experimental study of time perception are dealt with and the assertion made that "consciousness is not so elaborately organized in the dimension of protensity as it is in the dimension of extensity." Further, there is presented a critical and informing consideration of the perception of long and short intervals. It is then pointed out that by definition a process is a change of something in time. Brain time, contrary to Köhler, is nevertheless not considered as thought time, but rather the possibility is presented that protensity involves rather elaborate relationships between excitations, possibly in these relationships involving, in some measure, cortical neural intensity. The conclusion is presented that "a relativistic interpretation of time robs it of much of its mystery."

The next dimension to be considered is that of quality and its related problem of modality. The author points out that it is a truism of physical science that quality tends to be reduced to quantity as experimentation proceeds. In psychology, however, quality has been peculiarly resistant to such quantitative reduction. Quotations from Bishop Berkeley and from Titchener are given showing that meaning may be carried in various sense modes. It is possibly significant to notice in these quotations, although the author does not emphasize the fact, that in both of them the object perceived through the mediation of the various senses is behaved toward in a specific manner. It is, however, later suggested that "knowledge is always a matter of discriminative response." This response theory of meaning is then shown to be directly related to the context theory. On the basis of a review of Müller's doctrine of specificity each of the senses is considered in relation to quality. The difficulty of understanding the problem of quality in terms of cerebral physiology is then illustrated by a reference to the special hypotheses which might be formulated in relation to visual quality, auditory quality, and the qualities of the somesthetic senses. In the latter treatment Nafe's theory is reviewed and is characterized as "not impossible, although it seems like a flouting of introspective facts." In summary of his views on quality the author himself says:

"*Quality*, however, presents the greatest difficulties of all. For difference of modality we have obviously the place theory; the projection paths of the five senses are different, and discrimination is a differential of this gross spatial differentiation. Within the modalities we are faced with puzzles. In respect of hearing, the author inclines to a frequency theory of pitch because of its subsumptive power. In vision it seems as if nothing but a place theory of three

elements could satisfy the requirements of color. The author argues that cutaneous should resemble visual sensibility in this regard."

Here again, it seems to the reviewer, the problem of quality remains refractory. As E. B. Holt has recently said in a very different effort to deal with psychology in physiological terms: "There is, however, one authentic psychological problem, that of 'secondary' or sensory *quality* to which physiology at the present time gives us not the slightest clue."

The consideration of quality concludes the treatment of the physiological psychology of the conscious dimensions. The author summarizes his conclusions by pointing out that in his view the problems of extensity may be problems of spatial organization, the problems of protensity of temporal organization also involving space, and intensity involving both frequency and summation. The old stumbling block of all systematic physiological psychology, the bodily correlate of quality, nevertheless seems still to demand special theories for each mode. However, in final conclusion, it is suggested that "In a certain sense we are looking for a 'place theory' of every dimension." It must be understood, of course, that such a "place theory" is not merely that implied by Helmholtz's extension of Müller's doctrine, but is as well dependent upon the whole mechanism of discrimination as developed by the author.

On the basis of this elaborate analysis the reader is next asked to consider certain aspects of the higher levels of integration, such as intelligence, attention and learning. In the treatment of intelligence the author deserts his suggestion of some years ago concerning the relationship between intelligence and speed of mental performance. On the basis of Lashley's and Head's work, as well as upon other grounds, the view is instead proposed that intelligence implies discrimination and that discrimination is itself roughly a function of the amount of effective cortical tissue available in the organism. The various classical problems of attention are briefly considered and the conclusion drawn that since the present book presents a "cognitive theory of all sensory processes" attention is reportability. And again, "the range of attention is the range of the cerebrum . . . you can reduce the range of attention with a scalpel." Learning is considered especially in relation to the classical work on memory. Physiologically the statement is made that:

"Learning is a matter of the establishment of neural organization, and depends largely upon the cerebral cortex. It is a mass action and its rate is a function of the amount of cerebral tissue available. Simple organizations that

lie within the adequacy of the cortex (within the 'range of attention') may be learned instantaneously in a single repetition. Larger materials that cannot at once be comprehended within a single 'attention' are organized piecemeal. Organization results in the functional 'reduction' of any material, so that parts after reduction can be comprehended in a single 'attention,' when before reduction they would have crowded each other out. Some of this reduction is due to surrogation, the substitution of a symbolic part for a whole. It is not at all clear as to whether all reduction is a matter of symbolic surrogation. Reduction is illustrated by the difference for organization of a brand new nonsense syllable and a familiar monosyllabic word. At any rate learning is a process of getting into a single consciousness more than it would originally hold."

The last chapter of the book is devoted to a formal exposition of a relational theory of consciousness which has of course necessarily been treated in some measure in each of the preceding chapters of the present book. Both existential psychology and Gestalt psychology regard experience in a way as given in its own right. Observation, to these theories, does not, at least in every essential manner, change the observed. This last chapter is devoted to a challenge of this view. At first the point is presented, reinforced by illustrations, that all introspection is essentially retrospection and therefore dependent upon memory. The author then offers a description of the stream of consciousness "with eddies and currents and pools" and concludes that this dynamic and relational view of consciousness points to the need of an adequate physiology of such processes. Here, incidentally, the position is taken that the ability to learn is a true criterion of the phylogenetic point which may be said to mark the onset of consciousness. Since more learning occurs in the brain, therefore consciousness is located in the brain.

"It is for this reason and for this reason alone that we think of consciousness as localized in the brain. It is in the brain that the discriminatory reactions, which make up consciousness, are formed and have to be studied. The peripheral relationships, being approximately fixed, can be left out of account when the formation of new relations is the business in hand. The correct road is chosen at the fork of the roads; nothing else counts in the choice. So discrimination belongs in the brain where it is finally determined."

Thus, in conclusion, in the author's opinion, by acceptance of his physiological and relational theory of consciousness, it may be said that:

"We have at last a causal theory of mind, in which the events of consciousness lend themselves to insightful relationships with other events. The gap between mind and body, never more than feebly bridged by isomorphism, disappears when we form our realities on this pattern."

The reviewer can imagine many different standpoints from which

this volume might be criticized. But in each such case the criticisms would largely be beside the point, because they would follow from different fundamental postulates. A few such criticisms are suggested below, not that they are the reviewer's own opinions, but that they indicate something of the alternatives at some of the many forks in the road down which the thesis of the volume travels. The reviewer, it should be stated, would himself probably usually take the path indicated by Boring and not by the hypothetical critic.

One such critic, a phenomenologist, for example, might well claim that the author's conceptualized experience is as much a retreat from the realities of consciousness as is behaviorism, which Boring himself criticizes because it has turned its back upon the traditional field of psychology. From this same point of view many psychologists will feel that there are arguments in favor of the conclusion that immediate experience may be studied and that what has been called "inspection" rather than retrospection leads to a description of the every-day world that is of value for psychological science. Indeed, they would say this world is just what it seems to be; it is not in the brain. According to this position a man appears to be as tall as he seems to be at five or ten feet from the observer, no matter what size the retinal image or even the hypothetical brain pattern may be. Similarly to such a critic the line in the Müller-Lyer figure with the wings pointing inward is shorter than the line with the wings pointing outward, no matter what the ruler may say, although, of course, what the ruler says is true when it is observed. Thus, to such critics, consciousness will be thought of as the given experiential world. They will hold therefore that the age-old puzzle of getting consciousness into the brain and then projecting it out again to the world will be avoided because it is not a valid question. Moreover, some of those who hold this phenomenal point of view may also argue that it is not essentially non-scientific, as Boring suggests, but that rather it may be made to serve a most neurological and quantitative psychology. By varying the physical stimulus-energies changes in the organism may be brought about which will be directly apparent in experience. By psychophysical and other procedures the stimuli may be continuously varied and thus eventually there will be built up a complete statement of a correlation between measured and known external energies, such physiological processes as are really known, and reported experiences. By this procedure present experience will not be analyzed or conceptualized, at least at first, but merely reported in a series of cases.

It is possible also that a critic of another complexion might speak of the fact that throughout the book the genetic approach to psychological problems is seldom considered. There are probably psychologists who would hold that many of the phenomena discussed would have been more adequately treated had the nature of their development been dealt with. Consider, for example, the problem of visual space perception. The author says, "The most significant thing about the perception of form is its immediacy." Is it not possible that this is only true after form has, so to speak, been learned? If this should by any chance prove to be the case, it would of course alter the immediacy of the perceived form in adult life, but it might throw significant light on the physiology underlying such perception. L. W. Gellermann has recently pointed out that all the chimpanzees and children of his experiments were observed to trace with their fingers the forms which they came visually to discriminate. Is it inconceivable that this observation, as well as all the facts which cluster about the experience and behavior resulting from the inversion of the retinal image, point to the importance of response in building up a percept of form? The genetic psychologist might even argue that any relatively constant pattern of visual stimuli may come to release behavior that is in some sense specific. The visual clue may be a distance-receptor sign for behavior previously found adaptive in relation to tactual and kinesthetic stimulation. Thus until disturbed the visual sign may come to acquire adult "immediacy." Such critics might even go further and assert that form perception, especially as illustrated in visual geometrical illusions, will never be fully understood without reference to the motility of the eyes or other muscle tonus changes which may become surrogates for such movements.

A criticism of the volume might also be offered by some conservative psychologists who still adhere to the older physiological psychology. To them the basic monistic assumption of the book that perfect correlation is identity will be questioned, first on logical and then on factual grounds. They will say that there is no proof that it is possible to read correct but unknown physiological processes from correctly known psychological processes or correct unknown psychological processes from correct and known physiological processes. Probably also such a critic will ask, whether wisely or not the reviewer is not at present asserting, why facts established on the rat brain may be directly applied and in a sense even extended in their

application to an understanding of human cerebral physiology. Moreover, the fundamental question will be raised in regard to the sureness of the time relationships which underlie any modification of the Bernstein or other cortical projection theory. Are there at present facts which make it necessary to assume that "consciousness" occurs at the time of the first cerebral action following primary afferent activation? Can it be demonstrated that a typical, full-blown perceptual experience, for example, ever arises before motor response has occurred? Some psychologists might assert that they do not know of any evidence which demonstrates this fact and even that there is indirect evidence which points in other directions.

Indeed, fundamentally, the question may be asked by psychologists of many schools whether the psychologist has nothing further to seek than a full account of experience in respect to the physical, physiological or psychological dimensions, as this book alleges. May not the student of mind also be concerned directly with certain aspects of response and of adaptive behavior? Certainly there are many psychologists who would answer "yes" to the last question. But it must be insisted again that this or any similar answer does not constitute a valid criticism of the present book. Phenomenology, existentialism, the motor theory, behaviorism, even genetic psychology, all present postulates and develop systems. Internal and external criticisms of logical systems should be kept separate if sound criticism is desired. And surely internally the present volume presents a consistent, challenging and most important new theory.

To the reviewer, therefore, it seems that any psychologist, no matter what his own particular systematic position may be, cannot help reading this book with enthusiasm for the brilliance of the argument by which its thesis is developed. In the volume he will find a program by which experiential psychology might be made a conceptualized science like physics; a program which suggests a vast field of basic experimentation. The program suggested is radical, but in the world of systems the really new is seldom conservative. Even if a psychologist's own systematic preconceptions, probably not many years ago "radical" and new, now blind him wholly to this newer formulation, he will in any case find the many accurate and informing summaries of recent experimental literature that are given in the volume of the highest value. It should also be pointed out that the scholarly notes appended to each chapter present an historical and critical matrix that must have the highest importance to students

concerned with the special problems treated in each section of the book.

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BARTLETT, F. C. *Remembering: A Study of Experimental and Social Psychology*. Cambridge, England: Cambridge University Press, 1932. Pp. x+317.

The experiments which this book reports are outside the current of contemporary American research upon memory but they are of sufficient importance to make a current of their own. In the bulk of the modern work an attempt is made to study the relations between memorial performance and other variables. The emphasis is on quantitative measurement and the analytic and descriptive characteristics of the phenomena measured are treated as secondary if they are considered at all. In Professor Bartlett's experiments, on the other hand, the first concern is with *what* takes place under varying conditions rather than with *how much*. Their data lead him to an important theory of memory and both experiments and theory are contributions not only to our knowledge of remembering as a narrow range of functions but also to the broad systematic perspective in which memorial functions have so large a place.

Perceiving, imaging and remembering are not sharply isolable functions and the major experiments upon the latter are introduced by a series of experiments upon the two former. Perceiving, which is for Bartlett the psychological starting point of the work, has been studied by means of briefly exposed designs and pictures; imaging by means of ink-blots. The results are not in their general significance new but placed in a perspective in which they are continuous with remembering they are valuable. They lend support, also, to a principle which pervades the experiments and which has been, as he rightly suggests, too little recognized, a principle which might be called *the indeterminateness of the stimulus per se*. "The psychologist, of all people, must not stand in awe of the stimulus. Uniformity and simplicity of structure of stimuli are no guarantee of uniformity and simplicity of structure in organic response, particularly at the human level" (pp. 3-4). Every cognitive reaction is "an effort after meaning" and cannot be understood in terms of any paradigm which neglects this search for meaning.

The experiments on remembering, which occupy nearly half of the book, are diverse and yield results which are discussed in detail.

Meaningful materials, such as pictures, stories or picture writing, are studied and are later recalled. In one group of experiments, in which Phillipe's method of repeated reproduction is employed, the subjects recall several times, in some cases with long intervals between recalls. In a second group, aimed at some of the social conditions of remembering, the same general materials are used but by the method of serial reproduction whereby A's reproduction is B's learning material and B's reproduction is passed on to C and so on through a long chain of subjects. A large number of protocols, representative of a very extensive body of data, are given.

A brief summary must fail to do justice to the richness of detail both of the presented results and of the interpretation which Bartlett places on them. The conclusions from the use of the method of repeated reproduction have much in common with the results of Wulf, of Gibson, and of Perkins, although the interpretations are not the same. In long distance remembering "the general setting, as expressed mainly through the subject's attitude to the material, continues to function, as also does outstanding detail. The actual memory process is strongly and evidently constructive, and there is much use of inference" (p. 93). All successive remembering shows a reduction of the material to a form which can be readily and satisfyingly dealt with by the subject. The character and conditions of this reduction are examined at length. Much the same general conclusion emerges from the data upon serial reproduction, although there are numerous specific variations. The analysis of the results is aimed throughout at discovering the specific character of the changes and at relating these changes to their conditions.

The chapters on the experiments are followed by a discussion of the character of perceiving, recognizing and remembering, a discussion which paves the way for a theory of remembering. "Remembering is not the reëxcitation of innumerable fixed, lifeless and fragmentary traces. It is an imaginative reconstruction, or construction, built out of the relation of our attitude towards a whole active mass of organized past reactions or experience, and to a little outstanding detail which commonly appears in image or in language form. It is thus hardly ever exact, even in the most rudimentary cases of rote recapitulation, and it is not at all important that it should be so. The attitude is literally an effect of the organism's capacity to turn round upon its own 'schemata,' and is directly a function of consciousness" (p. 213). Especially worthy of note is the treatment of the 'schemata.' This theory calls attention clearly to the active and

constructive character of remembering. It leaves without systematic treatment some of the basic concepts and assumptions, and requires for detailed evaluation a greater amount of critical elaboration than is given.

From his theory of remembering Bartlett turns to an examination of images and their functions and then to meaning. These two chapters contain much that is significant for general systematic psychology as well as for memory itself. In the remaining 60 pages the relation between remembering and social psychology is treated in a manner which, while sketchy, calls attention to a group of problems hitherto little considered by most psychologists. The whole book is a lineal descendant of the British systematic tradition. It enriches the tradition, adds new experimental facts, places many concepts in a new perspective, and sets new experimental problems.

The valuable features far outweigh the faults which a reviewer may find with it, but there are a few things which deserve critical noting. Although many records are often available for each subject, the number of subjects employed is small for the weight of interpretation which the data are made to bear and the populations used are sometimes not homogeneous. The conditions are rather those of everyday life than of laboratory control, and the qualitative character of the main results leaves large room for personal interpretation. This is, for the most part, intrinsic to the problems studied and to the methods. One can scarcely doubt, however, that the data obtained are worth the effort. The treatment is sometimes repetitious and is sometimes discursive rather than closely knit and systematic. General theorists, in company with those whose special interest is in memory, will, nevertheless, find *Remembering* an interesting and provocative volume.

JOHN A. McGEACH.

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MURPHY, GARDNER, and MURPHY, LOIS. *Experimental Social Psychology*. Harpers, 1931. Pp. 709.

Here we have, for the first time, a social psychology that is almost entirely experimental. The authors begin by distinguishing between the arm chair type of systematic, scholarly social psychology and the results of experimental work in the social field. Their product is a minimum of the former and a maximum of the latter. Readers of

this review who have not seen the book will want to know something about its nature and contents, and its probable value.

Briefly, it is a summary and a critique of the most important experimental data of social psychology. The authors evidently went through hundreds, yes, even thousands of titles of books, articles and dissertations which lie not only in the strictly psychological field but also in the wider fields of allied social sciences. From these they selected for inclusion only a small proportion of the total amount of material available. Their criteria of selection are not stated, yet they do state their guiding concepts. For example, the concept of culture is of paramount importance. Events which are described as cultural are also activities of organisms. Again social psychology is concerned with behavior which is *primarily* stimulated by persons rather than things. According to the authors "Social psychology studies individuals in their interaction *when the analysis of impersonal stimuli and the fact of historical determination are not matters of primary concern.*" This definition evidently guided the authors in their selection of materials."

The book is more than a mere compilation of data put together in the fashion of the conventional article which summarizes experimental results. The data are well organized and presented in the first instance according to the conclusions of the experimenter. The authors are usually careful to keep their own interpretations and criticisms clearly labeled. The book is therefore a collection and analysis of the recent and most significant experimental literature in the field of social psychology.

The scope, content and organization of the book is revealed by its main outline which is in three parts. Part I is called "Basic principles" and includes a discussion of the place of psychology in the social sciences. There follow three chapters on the Biology of Motive, the Causes of Individual Differences, and the Learning Process in Social Situations. These chapters deal with the problems of reflexes, drives, innate patterns of social responsiveness, innate likes and dislikes, the biological and cultural concomitants of individual differences in intelligence, conditioned reflexes, suggestion and imitation as the main forms of learning in social situations.

Part II is called "A Genetic Study of Social Behavior." The experimental data presented include methods of studying the social behavior of children with special reference to infancy and early child-

hood, the process of social development in infancy and childhood, social behavior in later childhood and adolescence.

Part III is called "General Laws of Social Interaction in Our Own Society." The topics discussed are competition, rivalry, social stimulation, the influence of an audience on performance, the detection of guilt, social resistance, the behavior of crowds, and other topics of this general nature.

The final chapters are on the measurement of personality and attitudes. These comprise what the authors call quantitative social psychology and deal mainly with methods.

In a book of this nature the critical reader will inevitably find much that he can criticize. One who is reasonably familiar with the literature will experience many surprises in finding that the authors have omitted studies which could or should have been included, and that they have included studies that could or should have been omitted. Again the authors incline to overestimate the value of some studies and underestimate others. For example, they appear to place too much emphasis on the Bonhom-Sargent studies of babies in which personality ratings were made at the ages of two weeks and again at the end of two years. The authors play up the correlations between these ratings for really more than they are worth. There are other cases of over- or underemphasis but on the whole the authors' appraisals of the vast majority of the studies are sound.

The meticulous reader will undoubtedly be annoyed by the incomplete condition of many bibliographical references. These references are appended to each chapter in the form of notes, which is a good scheme. But since the chief value of the book is as an aid to research workers it is unfortunate that such items as the names of publishers of books are frequently omitted.

Perhaps the most outstanding impression which this book leaves with the reader is the spotty nature of the experimental data in social psychology. It is literally strewn with odds and ends of experiments, with here and there a larger piece of work extending over a period of years. Another striking fact is that so few experiments are repeated by other investigators. That which is so common in the physical sciences rarely happens in the social sciences. The result is an increasing accumulation of unverified data. The authors of this book have done well to call attention to the gaps in the data as well as to their inconclusive nature.

MARK A. MAY.

Yale University.

SCHOEN, M. *Human Nature*. New York: Harpers, 1930. Pp. xviii+504.

GILLILAND, A. R., MORGAN, J. J. B., and STEVENS, S. N. *General Psychology for Professional Students*. Boston: Heath, 1930. Pp. vii+439.

DOCKERAY, F. C. *General Psychology*. New York: Prentice-Hall, 1932. Pp. xxi+581.

In his preface to *Human Nature*, Professor Schoen asserts that the book is to be considered "a textbook and not a treatise," disclaiming for it any controversial position. He adds that the text "may justly be charged with being a mixture, of biology, psychology, and philosophy, with a bit of sermonizing thrown in for good measure." The preface seeks to justify this mosaic of materials on the grounds that psychology has strong relations to both biology and philosophy, and that a certain amount of homily is necessary to convince the student that the science of human nature is really veridical and useful.

The present reviewer cannot very well quarrel with the intention to present psychology in a broad systematic framework, though he cannot find that the book itself is distinguished by any great efficacy in this direction. Nor can he dispute the pedagogical advantages of sermonizing, provided the sermon takes the form of concrete and familiar illustrations of technical principles. But, as it stands, *Human Nature* deserves a place intermediate between the quaint dialectics of the British Empiricists and a C-minus examination book in an introductory course in psychology.

The chapter headings cover most of the conventional subject-matter. But the presentation is not in the form of sustained argument from experimental demonstration to theoretical generalization. Indeed, one of the severest criticisms to be made is that the unprofessional reader would almost constantly be unable to distinguish fact from personal speculation on Professor Schoen's pages.

What acceptable factual matter is included is often hopelessly entangled in contradictions and outright errors. On one page the reader must struggle through a naïvely confused argument to find at length the unqualified conclusion that "one's education is, then, the only measure of one's intelligence"; while other less dubious statements are offered in too hesitant language—for example: "It is supposed [!] that timbre depends upon the number and relative intensities of the overtones in a wave." The psychologist may for-

give, on historical grounds, the doctrine that "sensations are the elementary native units of mental experience," but he can hardly be expected to agree that the attributes of sensation are "feeling-tone, degree of intensity, duration, after-effect, contrast, synaesthesia, and accommodation."

The sermonizing which Professor Schoen has intentionally included strikes the reviewer as neither very relevant to psychology proper nor very adroit. It runs quickly into judgments of value which the psychologist has neither the right nor the authority to make, such as definitions of what is criminal, or moral, or the "best" type of personality. The beginning student has already so false a notion of the province of psychology, that it is highly unwise to mislead him in this fashion in an introductory text.

The authors of *General Psychology for Professional Students* have endeavored to answer the requirements of the student who wishes a knowledge of psychology essentially practical in emphasis and who has little ultimate interest in psychology as an independent discipline.

Such a student would ordinarily turn to one of the texts of applied psychology, where he would find the facts of psychotechnology arranged under the rubrics of fields of application. But in this book, the presentation follows the usual order of general texts, so that sensory, perceptual, attentional, etc., considerations are dealt with as unitary subjects, and the applications of these fields to practical life are suggested wherever they are relevant to the systematic discussion.

This method of organization has the obvious advantage of impressing upon even the least theoretical reader the fact that there does exist a body of psychological science arranged in a more logical sequence than a sheerly technological interest would favor. On the other hand, the authors have been perhaps too eager to give the impression that no principle in psychology is without demonstrated practical importance; so that what is a real unevenness in technological development has been masked by the introduction of sometimes very trivial pragmatic considerations where important conclusions are difficult to find.

Moreover, the system of psychology upon which the practical conclusions depend is highly simplified and not over-modern. The chapter on perception, for example, treats of almost no principle that could not have been found in Ladd and Woodworth many years ago; and the student who depends on it for his knowledge will have no

notion of the fundamentally oriented research that has transformed this field in the last decade. Learning, again, is handled with an almost complete omission of all the doubts which now, more than ever, apply to the relative importance of its classical laws.

It might be protested that there is not room for subtlety or completeness in an elementary text. But if the book is intended to be of practical value, its principles must apply—and they will not apply if they are incompletely stated, unsophisticated, or superseded.

Professor Dockeray's *General Psychology* provides a very competently written elementary textbook. The systematic attitude is behavioristic in a broad and consistent sense, presenting psychology as the science of the relations between a developing individual and his environment. It is not "behavioristic" in the narrower sense of evincing any predilection for oversimplified physiology or too segmental analysis.

The contents of the book are thoroughly catholic in scope, and thoroughly up to date in their reference to critical investigations. The student, immediately after his introduction to any subject, is brought quickly to the consideration of typical experimental evidence bearing on the field. For all its richness and specificity of illustration, the book does not suffer from logical incoherence. A copious sequence of introductory chapters prepares the general scientific and methodological background, defining psychology and placing it in relation to ancillary sciences; and the subsequent chapters fulfill this outline in an orderly and cogent fashion.

The order is not that of fields of psychology, but of types of functional relation to the environment: the genesis of behavior, motivation, disorganized behavior (emotion), organized response, sensory discrimination, learning, thinking, levels of attainment, social behavior, and personality. In this method of approach, Professor Dockeray has avoided unnecessary departmentalization of psychology, and has given his book a form in keeping with the attractiveness of its content.

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HIGGINSON, GLENN D. *Fields of Psychology*. New York: Henry Holt, 1931. Pp. xviii+613.

Professor Higginson informs us in the introduction to *Fields of Psychology* that his purpose in writing the book was to "provide a form of orientation for those students who wish a deeper understand-

ing of the subject-matter of psychology, but who are unable to study those specialized courses in each of which a more adequate treatment of the materials of a special field is to be found." It is difficult, from a reading of the book, to define clearly what demarcates such fields. The plan of exposition suggests by its form that a field is determined to a certain extent by the possibility of applying its subject-matter to a unitary problem; but it would be unjust to represent the text as ordered by sheerly psychotechnical considerations. On the other hand, the problems which establish the fields are not those which are absolutely internal to psychology—such as the problems of memory and learning, perception, motivation, etc.—for the reader will find each of these matters in part subsumed under various headings like "The Psychology of the Animal," or "Psychology and Education." Perhaps the safest statement is that the fields are really functionally determined by the circumstances in which the individual psychologically considered finds himself, whether in the school room, before a court of law, or in the cradle.

An introductory chapter provides a well organized and elementary treatment of the nature of science, its purpose, and its method. Science is distinguished from the appreciative and utilitarian attitudes by its search for disinterested understanding; and psychology is ordered among the sciences as a discipline which seeks particularly an understanding of the functions of the total organism.

The two succeeding chapters are devoted to the treatment of the outstanding current systems of psychology, and they embrace a discussion of structural psychology, functional psychology, behaviorism, the Gestalt approach, and the "psychology of the psycho-physical organism," which may be described as an eclectic functionalism. The author is frank in his partiality to the last viewpoint, but his discussion of the other schools of psychology is at once fair-minded and lucid. The treatment of structuralism—always a difficult matter of exposition for the beginning student—deserves admiration.

The course of the book now turns to biology proper, with the intent of presenting the essential notions of animal development and physiology of which the student of psychology must have some familiarity. The doctrine of evolution and the principles of genetics are treated at some length, as well as the elementary anatomy and physiology of the nervous system and the related forms of behavior. The sixth chapter concludes this sketch with an outline of psychologically relevant facts of anthropology. This whole pre-psychological group of chapters is again commendable for clearness and competency; and though the field is necessarily elementarily handled, it

must undoubtedly refresh the memory of students whose biology has become rusty.

A succeeding section considers the psychology of the developing individual. Its problems are those of bodily, mental, and behavioral growth in childhood and decline in senescence. A discussion of the socialized individual and his groups follows, in which both the principles of social psychology and their possible significance for society, government, and the home are developed.

We come now to differential and applied psychology. Under the first of these rubrics are treated the measurement of aptitudes and intelligence and the topics of racial, occupational, and sexual differences in respect of various traits. The section dealing with applied psychology offers chapters on the psychotechnology of education, industrial efficiency, advertising and salesmanship, and legal and legislative practice.

The last pages of the book—comprising a large proportion of the text—are devoted to the subject of abnormal psychology. The treatment is orderly, beginning with the fundamental mechanisms of psychopathology, carrying through a generous description of particular symptoms and diseases, and concluding with an exposition of the classical methods of therapy.

Every chapter in the book is provided with a copious and well-selected bibliography, drawn not merely from text-books but from the journals as well. The bibliographical material alone ought to be of considerable assistance to the student who wishes to read independently of the particular assignments of a course.

The possible criticisms of Professor Higginson's book would seem to the reviewer to be two in number. The first is that there are frequent passages in the text which are not consistent with the author's well-put characterization of science. That is, the author allows himself more than occasional paragraphs on questions of social and institutional policy; and although psychological principles, and especially the technological findings of psychology, may well supply evidence for such decisions, it must be clear that matters intrinsically those of social ethics are properly beyond the scope of any "field of psychology." The criticism, however, is perhaps of minor weight in respect of this particular text; for Professor Higginson is doubtless concerned to orient the elementary reader not only with reference to psychology, but also with reference to the disciplines which border on psychology and which define it by their neighborhood.

The second criticism is that the reviewer, at least, misses in a

single reading any consistent reduction of the problems of the various psychological fields to common first principles. He fears that an unsophisticated reader might easily acquire the impression that the facts of observation belonged somehow peculiarly to the psychology of the witness-stand, that the laws of learning were operative largely only in the class-room, and that the principles of configuration formed an isolated study having applicability to neither of the former. The reviewer would by no means impute this belief, or the intention of creating it, to the author; but experience, which must be common to all teachers of elementary courses, leads him to question whether the student who took Professor Higginson's book as an introduction to psychology might not need considerably more guidance toward fundamental concepts than he would find in its pages.

By way of commendation, the scope of the material with which the book deals is courageous; but, despite the magnitude of the task, no one of the general topics with which Professor Higginson has burdened himself is inadequately treated. Above all, the material is enthusiastically presented; there are no dry and tedious deserts of knowledge spotted with mere cases of interest. The style is at once elementary and pleasing. Too often the writer of an introductory text confuses simplicity of subject-matter with a puerile and inelegant presentation. Professor Higginson's manner of composition excepts him unquestionably from that company.

DWIGHT W. CHAPMAN.

Harvard University.

PERRIN, F. A. C. *Psychology—Its Methods and Principles*. New York: Henry Holt & Company, 1932.

This is Perrin's revision of the earlier Perrin and Klein of the same title. The general scheme of presentation remains that of six large topics. The arrangement of the material within these topics has been shifted in the direction of greater functional coherence.

According to the author, this edition differs from the first "in two respects. In the first place, it assumes that introductory psychology should be presented from the eclectic point of view. The writer is convinced that both cultural and scientific considerations justify this standpoint in contemporary psychological thinking. In the second place, the present edition places special emphasis upon the integrative process. It follows the original edition in holding that behavior is fundamentally purposive in character, but it supplements

this view with the additional proposal that integration and adaptation are interdependent concepts."

FLORENCE RICHARDSON ROBINSON.

New Haven.

RAGSDALE, C. E. *Modern Psychologies and Education*. New York: The Macmillan Company, 1932. Pp. xviii+407.

The author's plan is to explain the significance of various psychological systems for educational theory and practice. To this end he begins by a brief and clear statement of each of six systems, namely Structuralism, Functionalism, Behaviorism, Purposive Psychology, Psycho-analysis and Gestalt Psychology. He next takes several psychological concepts and explains the attitude of each one of these systems with reference to each concept. The concepts are Instinct, Emotion, Mental Inheritance, Learning, Tests. He then takes certain problems in educational practice, and shows the implications of each psychological system with reference to these educational problems. These educational topics are Individualized Instruction, Guidance, Pre-school Education, Adult Education, Extra-Curricular Activities, Physical and Health Education, Personality and Character Education, Mental Hygiene, Experimental Education. This is the general plan of the book and the author has carried it out exceptionally well. There are obvious difficulties in such a plan. Sticking to it manfully, as our author does, he is hard put to it at times to show any connection or implication for all of his six systems of psychology with each and every educational topic. So he has honestly to tell us several times that Gestalt Psychology is at present so undeveloped as to have nothing to contribute to many of his educational topics. And Psycho-analysis has little or nothing to contribute at many points. Although the author's own leaning is obviously toward Behaviorism or Objectivism, he does not allow this system to dominate the book. Again we repeat, that what he has set out to do, he has done excellently, and this must be considered high praise in the domain of literary criticism.

As to the value of such a book for students of education, opinions will vary greatly. Some teachers will welcome it, and, I fear, will expect their poor students to know exactly what the six "systems" of psychology believe with reference to psychological concepts and their (sometimes forced) implications for educational theory and practice. Personally I would keep such a book far away from the average student of educational psychology and only surreptitiously lend it to advanced students of a philosophical bent who have already

been infected by the virus of psychological philosophizing and system-making. The book emphasizes the important fact that psychology and education still suffer from a plethora of systems and philosophies and hypotheses on the one hand, and a dearth of facts on the other. For teachers who want their students to be familiar with all these systems and theories, this book is the clearest and best introduction that I know of.

It has no bibliography and there are no references. I can imagine many students being disappointed because of this. There is a grievous error on page 220, where Pearson is given credit for the common factor theory. I cannot find Spearman's name in the book. It is not in the Index of Authors.

R. PINTNER.

Teachers College, Columbia University.

GRUENDER, HUBERT. *Experimental Psychology*. Milwaukee, Wis.: Bruce Publishing Co., 1932. Pp. xiii+455.

"Experimental Psychology" is one of a series of books edited by Joseph Husslein "whose purpose is to provide the discriminating reader with a catholic literature expressive of the catholic tradition of learning, and offering authentic and authoritative discussions of problems of universal interest." The present volume is based upon a series of lectures delivered to graduate students at Saint Louis University and in it the author has hoped to answer, in an unbiased manner without making "unwarranted metaphysical assumptions"—stressing the empirical aspect of conscious life—the question, "What has Experimental Psychology accomplished?"

The first chapter serves as an orientation under the heading, Scope of Psychology. There follow four chapters on Sensations, the first being a general discussion of the subject followed by two on Color Sensations and one on Auditory Sensations. The next three are concerned with Monocular and Binocular Perception of Space, followed in order by chapters on Imagination, Memory, Attention, two on Instincts and two on Thought, concluding the volume with a chapter on Will. In the chapters on Instincts Köhler's work with the apes predominates and monopolizes the discussion. Instincts for Gruender take on a religious connotation as evinced by his statements to the effect that they exist according to a Divine Plan. The chapters on Thought are by far the most noteworthy of the whole. Gruender, a former pupil of Kuelpe and Buehler, follows the Würzburg School completely and presents its view most clearly.

This book is written in an elementary style and clarity becomes its virtue. It perhaps will be more interesting to the layman than to the experimental psychologist or student. Its reading is rendered easy by grace of a copious supply of italics where emphasis is desired. The references appended to the end of each chapter for further reading are few and on the whole a bit out-moded. This reviewer feels that more modern literature could have been used as reference material along with a greater diversification. Because of the small amount of experimental method, procedure, and results included, the book takes on more of an appearance of a text in General Psychology than of Experimental Psychology and the answer to the question previously stated remains unanswered or is obscured.

AUSTIN L. WELLS.

University of Pennsylvania.

VALENTINE, WILLARD LEE. *A Psychology Laboratory Manual*. New York: Prentice-Hall, 1932. Pp. vi+285.

This laboratory manual developed at Ohio Wesleyan and Ohio State Universities contains 49 experiments. The introduction is concerned with a discussion of thresholds, psychophysical methods and some of the simpler statistical concepts. Sections follow on reflex, work, subcutaneous reactions, attention, sensation, perception, learning, thought and judgment. Two or more experiments are included in each section. One feature of the manual is the gradual introduction of the more complex statistical concepts as they are required in the treatment of results. The manual is designed for use in a laboratory which possesses a considerable amount of apparatus, many pieces of which are of considerable degree of complication and several of which do not have wide distribution in psychological laboratories. It seems to the reviewer that a discussion of the Weber-Fechner Law and the psychophysical measurement methods as found in the introduction might tend to considerably curtail the interest of the beginning student in psychology for whom this manual is designed.

SAMUEL W. FERNBERGER.

University of Pennsylvania.

BURRIDGE, W. *A New Physiology of Sensation*. London: Oxford University Press, 1932. Pp. vi+70.

The sub-title of this little book is "A Cardiac Study." In his earlier researches upon hearts the author developed certain principles

of heart action which he now applies to the interpretation of the process of sense-perception. He criticizes current views on the ground that they are based upon a concept of excitability derived from the nerve-muscle preparation. He suggests that the sense-organs may be rhythmically acting structures, and that when they are stimulated their reaction resembles that of a stimulated heart rather than that of a muscle. On this basis he reinterprets psychophysical phenomena, especially those of vision, claiming that a more consistent explanation of sensation is achieved in this way. He also extends the application of his principles to the interpretation of the mind as a whole, relating his own views to those of Freud. The latter's interpretation he approves in general, because it regards conscious processes as the product of two interacting forces, the very pattern of heart action.

The author's reasoning is by analogy, and analogy has its scientific uses in suggesting new points of view and lines of investigation. One cannot read the author's compact chapters without being stimulated to thought. One wishes, however, that he had carried over his experimental methods as well as his theoretical viewpoints to the new field of application. It may be that older views of sense-organ excitability have been influenced by studies upon nerve-muscle preparations, but these views have been tested by experiments upon the sense-organs themselves. Until the author's fundamental assumption that sense-organs react like hearts has been similarly tested, it will be impossible to appraise the real significance of the theoretical structure he has built upon this foundation. For this reason also, those who are inclined to the view that consciousness is the product of interacting forces will fail to find in the author's suggestions a new support for this view.

JOHN T. METCALF.

University of Vermont.

SCHOEN, MAX. *Art and Beauty*. New York: The Macmillan Company, 1932. Pp. 230.

Hegel somewhere remarked that the artist is the last person in the world to whom the philosopher should go for enlightenment on the subject of aesthetics. In spite of the prominent place which a few artists have secured for themselves in the history of aesthetics, it is nevertheless true that in general those actively engaged in the creation of works of art have not been noted for their philosophical or scientific contributions. The author of the present volume, how-

ever, is apparently of the conviction that the comments of artists on aesthetics have been unduly neglected. He therefore tries to remedy the situation by giving over the major portion of his book to quotations from artists. "In these pages I have tried to present . . . what I have learned after years of sincere searching, about art, artists, and artistic activity, from those who have a right to speak, the creators themselves. I have done so, in so far as I have deemed it advisable, in the words of the original writers themselves, hence the unusual amount of quoted material, for which, I suspect, critics will take me to task."

The reviewer who doubts the value of such a disarray of pronouncements about art by its creators, or who questions the possibility of bringing systematic order out of their chaos is thus disarmed at the very outset. "But I have not written for critics. I have written for myself and for those who seek to understand rather than to judge."

For the psychologist the chief value of the book will be found in Chapter VI in which Schoen digresses to examine briefly a few of the better-known theories of aesthetics taken from the writings of philosophers and psychologists. The theories examined are: intrinsicality, disinterestedness, significant form, objectification, empathy, psychical distance, intuition, aesthetic repose, and catharsis. It may be a source of comfort to those who have been inclined to deplore the lack of agreement in aesthetic theory to discover that these various theories are regarded by Schoen as merely verbal variations on a single theme.

The first three theories are practically interchangeable. "We can then state any one of these three theories in terms of the other two. Thus, in the disinterested attitude attention is centered on the essential, intrinsic aspect of an event, and this aspect is, necessarily, its form. Or, when attention is focussed on the intrinsic aspect of an event, that is, on its form as form, the attitude is disinterested, in that any considerations of the effects of the event are out of mind. Or, when attention is centered on the form of a phenomenon rather than on its consequences, the experience is necessarily intrinsic and disinterested (p. 137 f). In the theory of psychical distance we learn that "experience becomes significant as such, valued as experience, while the fruit of experience, namely, the extrinsicalities that arise in the interested attitude, are absent. This theory is, then, but another restatement of those of disinterestedness, intrinsicality, and significant form" (p. 139).

Santayana's famous definition of beauty as pleasure regarded as the quality of a thing merely tells us "that since what is present to mind in the intrinsic, disinterested, psychically distanced attitude is not subjective meaning, but objective meaning, the feeling-counterpart of the experience is also objective. Beauty is not so much pleasure objectified, but rather the pleasure is objectified because beauty is an objective experience, and hence the pleasure-aspect of the experience is also objective" (p. 141 f).

In the theory of intuition advocated by Croce "we have a restatement of the doctrine of intrinsicity, and therefore, by implication, also of the other theories, with the addition of the idea of expression" (p. 143). Even the doctrine of empathy turns out to be susceptible of subsumption under the previous theories inasmuch as it adds nothing new. "All that may be said of empathy is that its rôle in beauty is that of its rôle in experience in general and it therefore tells us nothing that is uniquely aesthetic" (p. 144). From Ethel Puffer's theory of repose we learn, according to Schoen, that "in the aesthetic state there is muscular tension, intense stimulation, but instead of excitement, restlessness, there is repose. Hence the exhilarating effect of beauty: increased tonicity, and also peace. In this state we have the cake and also eat it. . . . Hence, in the theory of repose we have the organic aspect of the Theories of Attitude" (pp. 144, 146).

The fact that "more ink has been spilled over the single sentence in the *Poetics* in which Aristotle states his theory regarding the function of the drama than has been the fate of any other pronouncement in the history of aesthetics" (p. 146) does not lead Schoen to suppose that the concept of catharsis contains anything particularly unique. "Catharsis, therefore, like aesthetic repose, is the physiological counterpart of the mental attitude in the experience of beauty. And the two theories are aspects one of the other, since the catharsis consists of the repose in tension, and the repose in tension is the catharsis" (p. 147).

The reader is now informed that "our examination of the aesthetic theories shows quite plainly that, far from contradicting each other, all of them are driving at one common substance in somewhat different language. What is this substance, this central thread that runs through them? . . . In sum: beauty is experience become significant as experience. . . . Such experience or activity is intrinsic, disinterested, objective, significant as form, psychically distanced, therefore reposeful, and therefore also cathartic" (pp. 147, 149).

The remaining chapters consist very largely of quotations from artists which Schoen interprets as exemplifications of the central doctrine of aesthetic theory. The book contains excellent documentation, a useful bibliography of titles in English, and a good index.

C. C. PRATT.

Harvard University.

PRATT, C. C. *The Meaning of Music. A Study in Psychological Aesthetics.* New York: McGraw-Hill, 1931. Pp. viii+253.

In this day when educators with little technical training write treatises on all manner of subjects, and many psychologists do not hesitate to apply their theories to fields with which they have little acquaintance, it is refreshing to come upon a book on the subjects of psychology, aesthetic philosophy and music whose author is an undoubted authority in these three fields. Although Pratt's "The Meaning of Music," therefore, merits critical review from the philosopher and the musician, it is rather as a psychologist that the present reviewer attempts his analysis of this interesting volume.¹

Without blindly following American experiential psychology to the exclusion of all Gestalt and behavioristic possibilities of treatment Pratt does analyze aesthetic experience into the traditional and somewhat overlapping categories of material, form and expression. He prefers, however, to substitute the term "meaning" for the word "expression." His definition of material is similar to those commonly given. His differentiation of form from meaning, on the other hand, is less common. In fact, it is from this attempted differentiation that much of the closely knit reasoning of the book devolves.

Meaning, for the author, refers to "those qualities which reveal no correspondence with the physical aspects of the stimulus" or "those qualities which have been acquired by an object through association and suggestion." "In its very broadest sense form may be taken to include all the divers ways in which the sensuous materials of experience are moulded and patterned at the hand of the artist." "The besetting sin of certain schools of psychology," says Pratt, "has been the use of the concept 'meaning' as a sort of wastebasket into which could be thrown various psychological experiences which

¹ It should be noted that the writer of the book's advertising jacket was not trained in any one of the fields with which the work is concerned. Either this was the case, or the book was not read. How else can one explain this statement: "In supporting the thesis that, more than any other art, music is a language of emotion, etc."? This doctrine is precisely what Pratt does *not* support.

did not yield conveniently to description in terms of simple sensory process." Pratt's aim, obviously, has been to rescue many phenomena of a musical nature from the wastebasket of meaning and to claim them as intrinsic properties of musical form.

The reviewer confesses that he can not agree with the validity of the criteria with which Pratt proves the intrinsic nature of such phenomena as falling cadence, the height of tones, or the tonic effect. The law of parsimony should certainly not be seriously invoked in this connection. Although this principle probably did wonderful service in times past it is now rather apparent that what appears as simple to one theorist may appear as highly complex to another. Why should an appeal to form be simpler than an attempt to prove that meaning is a better explanatory principle? Pratt's own experiment on the intrinsic height of tones has never seemed a convincing one to the reviewer. Perhaps this is because the latter has never been under the magic spell of strict introspection. However, Dimmick and his trained introspectors could not verify Pratt's apparent findings.¹

Is it correct to infer that if one proves a correspondence between phenomenal quality and the physical aspects of the stimulus he has excluded meaning? Of course one can define terms to suit the fancy. However, if form in Pratt's sense includes much which others call meaning, then Pratt's thesis for the potency of formalism loses much of its strength. Let us suppose that a world dictator could force a single language on all people. As a result certain words might be found which corresponded and varied perfectly with certain object stimuli without being more than trained in responses. Although we know of no such dictator in music there remains the possibility that much *may* have been stamped in by informal training. Pratt's belief that the finality effect in music, for example, is intrinsic in tonal form is, to the reviewer, in no manner proved. It is merely one of four or more possible theories. Yet it may well be that much that has formerly been termed "association" is rather intrinsic in form. Real evidence is not at hand at the present time, however, to settle the issue.

For Pratt, music is "*not* the language of emotions if that phrase is taken to mean that a given composition is capable of arousing a subjective feeling on the part of the listener. It may, or it may not do this. . . . If, on the other hand, the phrase is intended to refer to an intrinsic character of music's moving tonal architecture, one

¹ *Psychol. Bull.*, 1932, 29, 655-656.

must then most certainly recognize in it, however bad and ambiguous the wording may be, an attempt to single out a property of auditory form which gives to music a richness and power not exceeded, if in fact it is equalled, by any other art." While it is not in the province of this review to discuss in detail philosophical issues, it should be briefly mentioned in passing that Pratt agrees in the main with Schopenhauer's famous theory of music. This held that music is not a copy of the Ideas, but a copy of the will itself. "It is this human striving, in all its variety of manifestations, that music is able so poignantly to suggest."

Pratt's treatment of the music test movement strikes the reviewer as both apt and clever, although a bit cruel. The music tester is left little for rebuttal except to say that Pratt has confused the concepts of reliability and validity in at least one instance. The tester might also note that Pratt does not seem to appreciate fully one usefulness of the tests. This is the demarking of the lowest limits for entrance to conservatories (provided registration is limited). In the main, however, Pratt certainly appears to have the best of the argument with the music testers. He points out their bold and unfounded claims and urges them "to return to the cloister of laboratory and study, there to examine more exhaustively the richness of musical experience." Pratt expects great good to come to music theory and practice from the concepts of Spearman.

Pratt's book is one that bears rereading. Although it makes no pretense of completely covering all or even any one portion of the psychology of music it would appear to be a real contribution to the field.

PAUL R. FARNSWORTH.

Stanford University.

WATSON, GOODWIN, and SPENCE, RALPH B. *Educational Problems for Psychological Study*. New York: Macmillan, 1930. Pp. xii+352.

The authors of this unique work say, in preface, that it is "an endeavor to practice what educational psychology preaches. It applies in the educational psychology course the principle that material should be learned in the form in which it is to be used." Certainly a commendable and unusual undertaking!

The topics are organized in a series of problems. In 20 chapters there are some 170 problems. Each problem illustrates some situation, that might really be met by a teacher. After the statement of

the problem are a few (1 to 6) questions rather carefully set to focus the attention of the student on the issues involved. Ample reference reading lists are given at the end of chapters.

It seems to this reviewer that the problems are excellently stated and that the questions are keenly conceived. It is stimulating to read through the book—and a bit discouraging—for so many of the questions in it—as in teaching practice, are ones to which we can give only the most tentative and apologetic answers. This, logically, is a healthy attitude, for there may be a tendency for the student trained mostly in general theory to be over-inclined to consider the application of his general theory to specific problems a rather simple matter.

This reviewer would criticize—before discussing the book as a whole—the work on two specific points. First with regard to the overabundance of references and the lack of specific direction toward certain ones. It is true that some of them are starred, indicating that they are of major importance—but in the chapter, for instance, on Character Training, there are 88 books and articles listed. Of these 10 are starred. Even if we only consider the 10 starred references (in addition to the 13 general texts recommended) the students' task in sorting wheat out of this mass of material is too great. The authors suggest various schemes, by which the references may be assigned—but this involves more difficulties than most instructors would undertake. Granted that one of the objectives of an elementary course is, or should be, to train students to locate and digest various published reports; this does not seem to be necessarily the most effective way to accomplish the objective.

Secondly, this reviewer feels that the interests of the authors have resulted in an unbalanced weighting of chapters. We have 2 problems on standardized achievement tests, 5 on character tests; 4 problems on vocational psychology, 24 on emotional conditioning; 3 problems on intelligence testing, 8 on curricula. The authors say that there are included more problems than will be used, and that the instructor—with the aid of the class, shall choose the ones to be done. It is certainly not to be inferred that the authors would have us understand that the actual weighting of problems in each chapter represents either their understanding of what is customarily taught in an elementary course in educational psychology (since one of them is the author of an article on this subject) or their exact belief as to how topics should be weighted. The unusual emphasis on "character" aspects of educational psychology seems to this reviewer a little dubious as a current policy.

Speaking, though, of the method as a whole, it does appear to have very real merits. How real these merits are can, of course, only be determined by actual trial. There is, at the college level of teaching, now current a curious situation. From all sides arises the cry that some of the poorest teaching in our educational system is done here; that the lecture method is formal, stiff, and unreal; that too many of our instructors are research men rather than teachers; and that few college instructors have ever studied teaching method. On the other hand there is accumulating a fair amount of experimental material relating to teaching at the college level. (For a summary see Hudelson in the 1930 Yearbook of the National Society of College Teachers of Education.) This experimental material, loosely interpreted, seems to show that it really doesn't matter *how* teaching is done at the college level. Achievement seems to remain about the same.

Perhaps the experiments have not been carefully enough controlled (but this would not be the case, for instance with Hudelson's excellent experiments on class size); perhaps "immediate" achievement (which is the measure of efficacy usually used) is not enough; perhaps other criteria than that of achievement, in the sense of being able to achieve a certain score on an objective test, are of coördinate importance; or, *perhaps*, principles that are known to apply say at the elementary school level, do not really apply with force at the college level at all. If this latter is really the case, and the evidence is piling up that it is, though few of us are willing to accept the evidence as yet conclusive, then perhaps our whole endeavor to heed these cries before mentioned for better teaching at the college level is somewhat futile. Perhaps this sane and stimulating book by Watson and Spence involves a teaching method that is certainly more difficult and perhaps no more effective than a straight lecture method. This possibility we must face.

But we are not able to say, at this time, that this is necessarily the case. Hence as an experimental method those teachers of educational psychology who have some faith that teaching at the college level matters or may matter might do very well to try out this new technique.

There are, of course, certain possible advantages in it that would not necessarily show up on an objective test basis.

1. Students might acquire some skills in reference work (which might have transfer values).
2. Students might acquire some skills in group discussion (which might also have transfer values).

3. Students' learnings by this method might be more functional in their later professional work than learnings in a traditional system.

4. Students learning specifically to handle this method of learning might find it of real use to them in their own teaching.

5. Students might enjoy this type of learning more than a traditional type.

All in all the book is very much worth while. If we are going to evaluate "problem" teaching as opposed to more formal teaching it is vitally essential that we have carefully worked out and tested (as these are) problems and techniques to pit against the older techniques.

DONALD SNEDDEN.

Harvard, Graduate School of Education.

KROH, OSWALD. *Die Psychologie des Grundschulkindes*. Siebente und achte Auflage. Langensalza: Hermann Beyer u. Söhne, 1930. Pp. 352. Preis, 6,60 R-M.

This book covers primarily the developmental period during which the German child is ordinarily in the elementary school. It points out, as it progresses, the relationships which this phase bears to the psychology of infancy, and to the psychology of adolescence, treating thus directly and indirectly the whole period of human immaturity.

The point of view is taken that education must be founded upon child psychology, now more than ever in Germany, since faith in *method* as the sole criterion of excellence in pedagogical technique has disappeared. The teacher can no longer be considered to be professionally educated when he has perfected himself in methods of teaching. He must, under modern conditions, inform himself concerning the motives of children, individual differences among them, their learning processes and their developmental psychology. This means that child psychology must be investigated and written anew. The child must be studied from all angles. Not experimental pedagogy only, nor the psychology of the senses, nor even the studies of mental life made by scientific methods can alone suffice. "Only an exact, verified knowledge of the child in all his relationships to life, which can be built up and proved from every side, by various severally appropriate methods, can satisfy the demands of both science and practice."

Setting out from this point of view (which has nothing novel in it for American students of education), the book is founded upon the German literature of child study since 1910. Nearly all of the investigations and theories used in weaving the text are dated

between 1912 and 1930. The work is thus thoroughly modern, so far as German investigation is concerned. The contributions of Jaensch on eidetic imagery, of Spranger on adolescence, of Ch. Bühler on the psychology of infant and child, of Kroh on development, of Eng on the emotional life, and of Fischer on the moral sense are all incorporated. The theories of the psychoanalytic school are not adopted, but are critically considered as not being consonant with the known facts about the extent to which infantile experience is organized and remembered (p. 74).

However, no thoroughgoing account of child psychology today can limit itself to German literature. For instance, to an American reader the discussion of "The Development of the Intellectual Processes" (p. 235f) seems inadequate and out of date, because all the wealth of knowledge and technique contributed by Binet, Burt, Terman, Pintner, Gesell and very many other investigators who are foreign to Germany is not presented. Mental tests and their practical significance for education are not treated. The large body of existing knowledge of exceptional children, which has accumulated from the past quarter of a century of work with mental tests, is not incorporated. In fact, the emphasis upon the quantitative, so characteristic of American texts today, is lacking. No table or graph is included in this text.

The book must thus be criticized as inadequate to enlighten German teachers in regard to the total knowledge now available in the world, concerning child development in relation to education, because what has been done in foreign lands is hardly at all presented. Educators outside of Germany will find the volume very useful, in bringing to their attention the points of view and the investigations of contemporary German students of child psychology, which in their own thinking and teaching tend, perhaps, to be neglected.

LETA S. HOLLINGWORTH.

Teachers College, Columbia University.

PINTNER, RUDOLPH. *Intelligence Testing, Methods and Results.* New Edition. New York: Henry Holt and Company, 1931. Pp. xii+555.

This edition replaces the edition of 1923 (reviewed by M. S. Viteles in the *PSYCHOLOGICAL BULLETIN*, 22: 380-381). The new edition follows the organization of the earlier book: Part I, Historical and Theoretical; Part II, The Methods; Part III, The Results.

Practically no change has been made in the historical treatment.

In the discussion of theory, new material bulks larger than the old. This is especially true of the sections on "concepts of intelligence," and "regularity of growth" which includes the constancy of the I.Q. Pintner's definition of "intelligence" has been replaced by his definition of "intelligent behavior." But in spite of an implied denial of a substantive "intelligence," the word is used throughout the book to stand for that which is inferred from intelligent behavior. In fact, (p. 97) Pintner seems to look forward to the construction of intelligence tests less dependent upon environmental factors. In the discussion of growth, although the need for equal units is emphasized, there is no reference to Thorndike's CAVD unit.

The description of tests and scales is presented in a more usable form. Eight of the old list are omitted and sixteen are added.

It is in the results of intelligence testing that new data are most numerous. A dozen or more new topics are treated briefly in a Miscellaneous chapter. To two new topics—children of preschool age, and the sexes—separate chapters are devoted. Of previously discussed topics, least change appears concerning the soldier, the dependent, the blind, and the feeble-minded, and most evident are the new data on the foreign born, the inheritance of intelligence, the high school and the college student.

Despite the new data, the chapter summaries in general are not very different. This is no criticism, except in the case of the inheritance of intelligence. Here it seems that new data should have led to a more conservative conclusion. Such a change was apparent in the case of the foreign born.

Not so much because of revision as because of additions, the new edition is a much needed and very valuable one. Hundreds of new studies are not only listed but used in the text.

J. W. TILTON.

Yale University.

BOYNTON, PAUL L. *Intelligence: Its Manifestations and Measurement.* New York: D. Appleton & Co., 1933. Pp. 466.

It is not easy to discuss the topic of intelligence without fear of contradiction. Smuggled into scientific psychology from our folklore, the term intelligence has offered great opposition to all those who dared to define it. One who undertakes to write a whole book on the subject surely is not planning to do without criticism.

Professor Boynton's definition of intelligence must be attacked as orthodox and excessively biological. Psychologists are showing a

persistent tendency away from an hereditary interpretation of intelligence and, for that matter, of any other kind, of behavior. To speak of intelligence therefore as dependent on the heredity of the individual only because intelligent activity is "part and parcel of cerebral activity" is like saying that a cat is a cat because he is not a dog. It is saying something about it, to be sure, but it is not saying all that there is to be said. Modern biology would not support Boynton in the claim that *function* of any kind may be inherited. And that, after all, is the issue at stake.

Another shortcoming of the book is the fact that the author does not include in it what every student of the subject, certainly every beginning student, wants to know. I mean a systematic presentation of the steps through which a test must pass before becoming standardized for use. One reason for this omission is possibly the fact that the validity of intelligence testing is not as easy to prove as is the reliability of standard tests.

My third criticism is offered with considerable reluctance. It has reference to the careless English in which the presentation of the material is couched. It is true that one need not be at one and the same time scientist and man of letters; yet whenever one aspires to recognition as an author of a text one must make sure of such details before releasing his printed work. There are those who, if not actually handicapped, will be less influenced by the text because of its occasional faulty English.

In spite of this difficulty, however, the book is eminently readable. It contains an excellent history of the intelligence-testing movement. It follows a logical plan of work. It is critical of certain unproved assumptions with regard to intelligence. It contains a fine bibliography and abounds in concrete illustrations. It is, in short, pedagogically sound.

The finest points in the book are its emphasis on the socio-cultural influences in the development of intelligent behavior, a point somewhat awkwardly reconciled to the original definition of intelligence. Another valuable feature is the section dealing with the methods of interpreting test data. By no means the least feature of the book is the chapter containing detailed instructions to mental testers. There is genuine need for this type of material in a text aiming to develop psychological technicians.

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HERSEY, REXFORD B. *Worker's Emotions in Shop and Home*. Philadelphia: University of Pennsylvania Press, 1932. Pp. xviii+441.

Men began writing about the effects of factory work about as soon as they began building factories. Throughout the industrial revolution the problem has persisted. With the increased specialization and intensification of labor in recent years, coincident as it has been with the new interest in mental hygiene, an unprecedented amount of attention has been given the issue, particularly on the psychological side. Moreover, the spirit of fact-finding has made itself felt in this realm as in social science endeavors generally. To date, nevertheless, careful first-hand studies of worker-work relations have remained rare. The inquiry reported in the present volume is one of the few intensive pieces of research.

This study attempted to analyze the adjustment of a small group of average normal workers—17 railroad shop employees in Philadelphia during 1927–1928. (Most of the data are for 12 of the workers; 12 other men in different occupations were studied less intensively later.) The investigator spent almost all his time for a year with the men. Four times a day for 36 weeks he interviewed each man about his feelings, the progress of his work, and his outside affairs. Outside the shops, too, he mingled with the men until he came to know them intimately and had their confidence. He was apparently successful in high degree in this combined rôle of friend, observer, confessor, and scientist. In addition to interviews and observations, records of production were secured, and also certain simple physiological measurements and psychological tests. Special emphasis was placed on the daily ratings of emotional level and fatigue. Altogether the data yield an intimate picture of the workers in relation to their work, shop environment, and outside situations.

The first two-thirds of the book contain interesting case descriptions of the individual workers. These chapters point out, on the one hand, the problem-situations or "crises" workers are reacting to, both in and out of work, and on the other hand, the individual peculiarities which determine the crisis-effects on production and emotional responses. The later chapters present data regarding these matters in more impersonal quantitative terms. These data are made the basis for analyses, interpretations, and suggestions for the better adjustment of workers.

Several principal conclusions are drawn from the material of the investigation. The most significant pertain to, (1) the relation

between production and feelings; (2) the causes of varying production and varying emotional level; (3) the rôle of fatigue feelings and their relation to "zest" for activity; (4) the occurrence of emotional cycles.

The feeling-production tie-up is of extraordinary importance. Industrial psychologists have long insisted that favorable attitudes and feelings are profitable, that they lead to better production. Do they? Hersey answers the question for his group by comparing individual production indices with ratings of emotional level by quarter-day periods. Production, he finds, is 8.5 per cent greater under the influence of positive emotions than when the feeling tone is negative. The relationship is almost entirely between *negative* feelings and *reduced* output; production under positive emotions shows very little change from neutral states.

While the figures and also the illustrative descriptions do thus suggest that production suffers with depressed feelings, the demonstration lacks convincingness. The ratings of feelings are necessarily highly subjective and crude. Conceivably the estimates were even affected by the investigator's observations of how the work was going—without the observer himself recognizing this influence. A slight influence of this sort could alone produce the relationship reported.

The production figures are likewise of unknown reliability; the question of their accuracy is not discussed. (Apparently the figures do not represent actual output, but percentages of standard rates. The effect of errors in rate setting are disregarded.) Most serious of all is the assumed causal relationship between feelings and output. Depressed feelings may cause lowered production, as Hersey maintains, but his figures could equally well imply the reverse relationship, or common causes affecting both feelings and output. The author does not tell how he decided that an emotion was "causal" rather than merely "coincidental." The analysis is valuable if it does nothing more than focus attention on the problem. What it does additionally is to show the tremendous difficulties in the way of scientific study of these complex problems.

These same difficulties appear even more vividly when an attempt is made to ascribe periods of high and low production and of varying emotional states to various causes in the work, the outside life, and the physical conditions of the workers. For each quarter-day period Hersey estimated as best he could the special influences affecting the worker. Counts of these influences over the whole course of the

study then yield a quantitative indication of their relative importance. A person's general physical condition is judged to be the most important cause of his variations. But all the tables of numerical data cannot alter the fact that we are counting up nothing but one person's good guesses.

In the discussion of fatigue, Hersey admirably emphasizes the intrinsic importance of fatigue *feelings* as contrasted with physiological symptoms. The feelings of tiredness he finds intimately dependent upon general physical well-being, on "zest for activity." The effects of crises on the individual's adjustment, and indirectly on his output and feelings, are likewise determined largely by his physical condition. Causes for tiredness or loss of zest are analyzed and counted as was done for emotional level. Outside activities, including loss of sleep, are considered the most important source of fatigue feelings; then comes physical activity; and third, emotional causes.

In the interesting and careful analysis of emotional cycles the author opens a rich field for further research. He finds more or less regular ups and downs in emotional level, each cycle extending over several weeks and having a characteristic period for each individual. He concludes: "These regularly recurrent fluctuations in emotional resistance have been found in every one of the 29 cases studied—without exception." The periodicity in the curves presented appears to me far less uniform and regular than Hersey judges it, but the data certainly indicate the tendency he describes. Not only with respect to the phenomenon as a whole but also with respect to possible explanations and related factors, Hersey has accumulated stimulating leads.

When the author comes to his final chapter, "Inferences and Suggestions," it becomes clear that he is primarily concerned with the practical personnel aspects of his investigations. He is interested in effecting better adjustment of workers. Hence the neglect of interpretive psychological theories. Early in the book we are told: "A constant effort has been made to approach the study of human activity with the lone concept of its basic dependence upon the available vigor of the organism in mind." This "lone concept" is obviously not adequate. Hersey necessarily goes far beyond it. But his further excursions are uncharted. There is no central theoretical thread in the discussion. I judge there were no clear hypotheses in the original inquiry. That is the one serious weakness in the whole study. In spite of that, the work is excellent in ways. For one thing it is

exploratory. It opens up problems (especially that of emotional cycles) and uncovers difficulties of method. But the study is valuable, too, because it is so human and sensible; it reflects real understanding and balanced mature opinions. The data serve as opportunities for expressing sound ideas on practical matters, even where the ideas could stand about as well without the data. I strongly suspect that is what most useful studies in the social sciences do.

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VITELES, MORRIS S. *Industrial Psychology*. New York: W. W. Norton and Company, 1932. Pp. xviii+652.

"Approximately twenty years ago Münsterberg presented the first systematic formulation of the problems and scope of an industrial psychology. . . . Today, there is available a wealth of experimental data, obtained in industrial investigations, to illustrate the concrete achievements of the science in increasing the effectiveness and happiness of man in industry." This quotation from Dr. Viteles's preface indicates both the orientation of the volume and the nature of its contents. The contrast is indeed striking between Münsterberg's pioneer book and the "concrete achievements" described in the present work. Many psychologists who have pursued their labors far removed from the applied field will be astonished and impressed at the amount and variety of careful experimentation that has occurred since the War. The book should go far to gain for industrial psychology a greater share of scientific and academic respectability than has ordinarily been conferred upon it.

Dr. Viteles has given what is essentially a summary of the problems, methods, and accomplishments of scientific industrial psychology. It is an excellent summary—excellent both in content and in the clarity and interest of its style. Almost all the important experimental work, foreign as well as American, is included. More than 600 contributors to the field are listed in the author index; profuse footnote references serve to orient the reader in the literature. While some of these references are to basic studies not specifically industrial in character, this is not true of the majority. The book is experimental and factual in its emphasis. There is little theory or speculation. This approach gives strength and solidity to the discussion. At the same time it restricts the issues treated and leads to condensed descriptive accounts of experimental work where readers might profit more from critical interpretations and discussions of

unsettled issues and implications. This certainly should not be viewed as an adverse criticism in the eyes of the great body of psychologists who are determined to be experimental or be damned. It simply means that the book does not do everything the reviewer wishes for. Few books do. Hence we repeat: This is a scholarly, mature, comprehensive, thoroughly informed summary of experimental industrial psychology of the more orthodox variety—if there can be orthodoxy in a field so new.

This volume is destined to have a profound influence in further defining and developing the field of industrial psychology. Precisely because it is so well done, we need all the more to consider carefully its point of view and emphasis.

The volume is divided into three sections—"The Foundation of Industrial Psychology" (about 100 pages); "Fitting the Worker to the Job" (about 200 pages); and "Maintaining Fitness at Work" (about 300 pages).

The first division describes the social and psychological background of industrial psychology and traces its history and relation to industrial development. Almost all the psychological portion of this introduction—well over half of the whole—is devoted to individual differences, with some emphasis in this connection on the empirical and clinical approach to the problem. For the most part Dr. Viteles treats individual differences and their quantitative study along usual lines, with his illustrations partly from clinical measurements and partly from industrial records. He departs from the usual in his vigorous criticism of the traditional Thorndike view that favorable traits are positively correlated. The questioning is well aimed and is backed with substantial data. Some consideration of the effects of homogeneity or heterogeneity of the data is needed here, though it probably would not markedly change the conclusion. The conclusion if sound, has important implications, as the author points out, for problems of vocational adjustment.

A long summary of studies on "nature and nurture" in explaining human variability seems to me of doubtful relevance. It is a first-rate summary, though it could well be more critical. Chiefly, however, I question that the tie-in with industrial problems is either close or clear. The apparent relevance is due to the easy acceptance of the notion, popular even among psychologists, that the hereditary and the acquired correspond respectively with what is persistent and what is modifiable in human nature. Industrial psychology is certainly concerned with the constancy or modifiability of ability and the limita-

tions on improvement. That is far from identical with the problem of what is inherited. Part of the experimental and statistical work cited by Dr. Viteles bears on the former question and part does not. Thus, the effects of training on individual differences are of decided practical importance, wholly aside from any question of heredity and acquisition. On this problem of training effects, as on many other questions of individual differences, the present volume serves admirably to acquaint the reader with previous scientific work. The value of the material, I think, would be enhanced if it were treated without reference to the heredity-environment question.

But there is a more serious problem to be raised with respect to this first section of the book. The question is whether industrial psychology is so completely a matter of differential psychology as to justify extensive treatment of that branch of the field to the actual exclusion of foundation materials from general psychology and social psychology—principles of learning, thinking, emotions, social interaction, etc. Dr. Viteles states explicitly (page 29): "Industrial psychology is based upon a study of *individual differences*—of human variability . . ." Now, it appears to me that "the psychological foundations of industrial psychology" lie quite as much in working conceptions of human nature as a whole as they do in quantitative description of people's differences. As a matter of fact, a little of this material on psychological processes is introduced in later sections of the book—for example, in discussions of learning and motivation. But only in the case of individual differences are the facts and principles considered worthy of detailed presentation.

The second major division of the book contains unusually clear and well illustrated explanations of scientific research on employment methods—the analysis of jobs and the judging of people's traits by means of interviews, application blanks, character analysis systems, and psychological tests. The traits to be measured are classified as (1) proficiency, (2) competency (potentiality), (3) temperament and character, and (4) interests. Views concerning the nature of the traits, especially general intelligence, are succinctly presented. The author then has an excellent chapter on job analysis (which includes, along with the usual occupational description material, illustrations of his own "job psychograph" methods, and of Gilbreth's motion study analyses) and another valuable chapter on interviews and allied techniques.

The treatment of tests is especially capable. The author describes several of his own careful studies on testing and cites various advances

which have been made in test selection of workers in America, in Germany, and to some extent in other European countries. It is difficult to see how anyone who reads this material can fail to be impressed by the practical accomplishments of employment psychology and by its promise for the future.

The remaining half of the book is devoted to the topic: "Maintaining Fitness at Work." It is concerned with the problems of safety, training, fatigue, monotony, industrial motives, personal adjustment, and supervision. On each of these matters psychologists have made distinctive contributions, and again the chapters include a remarkably large part of all the available material. It is impossible in a brief statement even to mention the many problems and studies dealt with. The author has covered the literature with a very fine-toothed comb. In addition, the treatment everywhere reflects his practical knowledge and intimate contact with the work he discusses. Nowhere is this more true or refreshing than in the three chapters on accident prevention.

The last few chapters—on motives, maladjustment of workers, and supervision—are least satisfying. On these matters precise knowledge is lacking and Dr. Viteles has chosen to do comparatively little "psychologizing" beyond experimental evidence. Nevertheless, a good sampling of observational studies—more or less scientific in spirit at least—is offered, together with brief interpretive views. General interpretive conceptions like instincts, however, are thrown overboard. Unfortunately, nothing is substituted. I feel apologetic in this criticism since Viteles has approvingly cited my views on the issue. My present position, however, is far removed from that of the article referred to. It seems to me now that we sorely need broad psychological interpretations or working hypotheses in approaching problems of work-motivation and personal adjustment in industry. The empirical investigations are fragmentary and inconclusive largely because they have no guiding stars. Yet, Dr. Viteles discards not only instinct, but also what has probably been the richest source of suggestion—the conceptions of psychiatry and abnormal psychology. The psychiatric approach, in fact, is dismissed with a few paragraphs of the most acrimonious discussion in the entire volume. A more extended and tolerant consideration of these views might have added considerably to the reader's understanding of human relations in industry.

The hard fact is that human affairs in industry present whole ranges of psychological problems that have scarcely been touched by

the experimentalist. An adequate industrial psychology cannot pass lightly over questions of labor unions, insecurity of employment and unemployment, radicalism and unrest, wage systems, and all the every-day interrelationships among workers, among members of management, and between management and workers. These matters have not been studied experimentally. They are none the less important. Moreover, psychology can supply valuable interpretations and bits of insight concerning such problems. The present volume does little along these lines. In so far as it is an *experimental* industrial psychology the under-emphasis is justified. Only let us remember that our thinking about the broad social and economic problems of industry cannot well limit itself to conclusions based on experiment. There is much sound knowledge in the world that does not rest on experimentation.

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MOORE, B. V., and HARTMAN, G. W. *Readings in Industrial Psychology*. Appleton & Company, 1931. Pp. xxxix+560.

This volume was compiled for the purpose of providing for industrial psychology a collection of readings comparable to those available in other branches of the science. The authors present the material in the following chapters or sections: *Introduction, Basic Principles, Popular Versus Scientific Procedures in Appraising Men, Technique of Personnel Selection, Rating Scales, Mental Tests and Individual Placement, Analysis of Occupational Interests, Vocational Guidance, Training the Worker, Efficiency and Scientific Management, Fatigue and Rest Pauses, The Working Environment, Accidents, Monotony, Morale: Motivation and Satisfaction in Work, Labor Unrest and Strikes, Leadership and Social Adjustment, and Distributing the Product*. The longest section is devoted to *Popular Versus Scientific Procedures in Appraising Men*, and the next longest is *Mental Tests and Individual Placement*. Not only are the writings of psychologists included but also some of representatives of "management," such as Henry Ford, and of "labor" such as Samuel Gompers.

The various sections are woven together by a short introduction to each chapter. An interesting part of the general introduction deals with the history of the development of industrial psychology. Of considerable value, as an accompaniment to the articles contained in

the volume, is a list of brief author biographies, about one hundred and sixty-five in number.

The volume possesses the advantage of most "Readings" in making readily available to the student a variety of original material. It suffers from the disadvantage of so curtailing the length of each original contribution as to make it impossible for the student to pass critical judgment on the material which is presented. With respect to homogeneity, the volume is superior to many Readings by reason of the introductory preface to each section, but it still fails to give a balanced and integrated picture of the field of investigation covered in each section. American and English sources are adequately covered, but German and other European material is, in general, neglected.

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TROW, W. C. *Educational Psychology*. Boston: Houghton Mifflin, 1931. Pp. xv+504.

One of the needs in books for students of education is the multiplication of illustrations. For a few gifted individuals it may be true that the mastery of principles insures competence in the application of these principles to actual situations, but for most students frequent situations, described and analyzed, are necessary if psychology is to make its best contribution to practice.

Trow's volume is a real contribution to this need. Written in a style which is easy to read it is outstanding in the number of times it stops to point out the implications for education. This is done without dogmatism and without slighting differences in points of view among different psychologists. There are several statements which can be questioned but the method of presentation is well adapted to help relieve the confusion which students often feel when reading several texts. The practice of expecting students to read several books makes this important.

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GOODENOUGH, FLORENCE L., and ANDERSON, JOHN E. *Experimental Child Study*. New York: The Century Co., 1931. Pp. xii+546.

The experimental study of the child has now grown to early maturity. In the place of incidental diaries and commentaries (the

authors do not mention Preyer), and in place of the questionnaire, we now have the main outlines of a laboratory manual for experimentation in genetic psychology. This is to say that research on processes of learning, both by way of method and by way of problem, is alleged to have grown so lustily that it can be more or less standardized for the sake of those who wish to know "the principles and methods of scientific child study." In simple and straightforward language, forty-one experiments (together with statistical and other accessories) are described in such a way that they might be carried out in any intelligent home.

The book opens with a none too critical, but nevertheless fair, resumé of the history of child study. Chapter 3, on modern methods of child study, might well have stood as the concluding section of Chapter 1. Between these two chapters, there is a brief account of some of the fundamental principles of development. The reader may be somewhat puzzled by this insertion, partly because the chapter makes no pretense at an exhaustive discussion of its title, partly because, if it had to be included at all, it might well have come at the end of the book, and partly because he may wish mightily that so productive a laboratory as the Minnesota Institute of Child Welfare would add this important chapter to the literature on genetic psychology. It may be too early to generalize on the facts that are now in; but Hollingworth's chapter on general development laws, the present chapter, and the odds and ends scattered through the literature, hardly bring the systematic side of genetic psychology as far away from Hall, Baldwin, and the folk psychologies as the laboratory has brought experimental methods.

Part II takes us directly into the workshop. First, there are notes to the instructor who would organize a course in experimental child study. This is followed by cautions and directions about becoming acquainted with the relevant literature. Subsequent chapters describe the conduct of an investigation, methods of handling children, and the student's report of an experiment. A brief description of methods of measuring bodily dimensions prepares the way for an initial discussion of some of the statistical tools which such research uses. The forty-one experiments then follow, viz., on sleep, food preferences, rate of tapping, general bodily coördination and activity, color discrimination, perception, attention, memory, problem solving, learning and habit formation, language, vocabulary, intelligence, socio-economic status, social behavior, play behavior, introversion and extroversion, laughter, emotion, mental hygiene, preferences for

school subjects, special abilities, and the like. As though to prophesy, at least in part, the future work of the Institute, Chapter 40 describes some 70 problems for advanced students, many of which might make master's or even doctoral theses. Scattered through the 37 chapters devoted to the experiments are further discussions of pertinent statistical tools. Chapter 31, for example, gives a highly adequate account of the Pearson product moment method of calculating correlations.

Part III is devoted to methods for collecting data. The topics are as follows: incidental observations and case histories, the questionnaire, direct measurements, rating scales and ranking methods, systematic observations without control of conditions, standardized tests of general traits or characteristics, and experiments or controlled investigations. A carefully selected bibliography of 403 titles represents a real achievement. The best of the appendices is a glossary.

In short, then, the authors have given us a word picture of the Minnesota Institute. This fact, however, is probably less significant than the testimony that is offered in behalf of a new chapter in experimental psychology. Further testimony is coming from Iowa, Yale, Washington, Vienna, Hamburg, and other centers of child research. It is already a far cry from Baldwin and Hall to the *Handbook of Child Psychology*. One may well look with interest to the end of another quarter century, not only with the eyes of an experimental psychologist but with the eyes of an educator as well.

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VILLEY, PIERRE. *The World of the Blind: A Psychological Study*. Translated by Alys Hallard. New York: Macmillan, 1930. Pp. 403.

The author of this book is professor of literature at Caen University, France. The book has been awarded a prize by the French Academy of Moral Sciences. The author has been blind from early childhood, and he gives us a valuable discussion of many of the psychological aspects of blindness by a blind man of high intellect. His main thesis is that the "blind man's intellect, intelligence and personality do not differ from those of the man who has his eyesight." Eyesight is not necessary for the perfect functioning of thought. All the elements of visual sensation, except color, can be

got through other senses. Sight is a long-distance touch, and the loss of it is a handicap, but it can be overcome. The blind possess language, which is of supreme importance for general and abstract ideas, and in this respect they are more fortunate than the deaf.

The author traces the invention of Braille reading and shows its importance for the blind. He gives us an account of how he himself carries on his intellectual work, and shows how literary work may be accomplished with patience and determination. There is a good discussion of the sense of touch, the power of orientation and the so-called sense of obstacles, with reference to various experiments which have been performed. The blind man's sense of touch is not innately superior to that of the sighted. What superiority he may possess is due to practice. The sense of obstacles, the so-called sixth sense of the blind, is due chiefly to audition, and not to skin sensations of air currents. If the ears are covered, the blind man is unable to perceive obstacles in his path.

The affective life of the blind is similar to that of the sighted. In music the blind do not possess special talents. They are no more nor less gifted than those who see. In the general life of the world the blind should be encouraged to take their part and should not be looked upon as beings apart. They are not a special class. They show the same individual differences as do those who can see. Much misinformation about the blind has been spread because of conclusions drawn from the study of one or two blind cases, and our author wisely remarks that "hasty generalization is one of the most common vices of the human mind."

This book is a valuable addition to the literature of blindness. It will give courage to many blind men in their struggle to overcome their handicap. It may help many of the sighted to take a more rational attitude towards the blind. The author has not attempted to cover all the psychological work in connection with blindness. He does not refer to recent work in this country dealing with intelligence tests of blind children. His contention that the blind as a group are equal in intelligence to the sighted is questionable. They are probably slightly below. But his contention that the blind manifest all degrees of intelligence is sound. The English translation of the book is good, although the translator has not been able in all cases to avoid the influence of some French idioms.

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TRAVIS, LEE EDWARD. *Speech Pathology*. Appleton and Co., 1931.

Though the entire field of speech pathology is covered in this book the central problem dealt with is that of stuttering. In justification of the special emphasis given to this problem the author attempts (p. 254) to subsume most other speech disorders under the same category of causation as that of stuttering.

Respecting stuttering his thesis is that it is organically conditioned. Stutterers belong to "an aberrant stock" (p. 139). The stutterer is "fundamentally different from the normal speaker" (p. 167).

The method by which the stutterer's neural predisposition functions in the production of his symptoms may be understood, the author thinks, when we remember that each half of the human body is a mirrored counterpart of the other, and especially when we realize that "this antitropic condition exists for function as well" (p. 11). The fact that the speech organs have no counterpart, there being only one set, the author gets around by saying (p. 14) that "the speech muscles on either side of the mid-line present a situation comparable with that which would exist if the two arms or the two legs were required to react always in unison as single structures." Over this half-and-half system of speech muscles the two cerebral hemispheres exercise a joint or "synarchic influence." "In so far as this joint government is harmonious, in so much the central prerequisites for normal speech have been fulfilled. However, this unusual anatomical situation offers marked possibilities of abnormality of function in that a dual control of a single mechanism might permit of a disorganizing ambivalent leadership. It is in relation to such possibilities that I have found the essential dysfunction of speech to be most understandable as arising from a pathophysiological subsoil. The principle of cerebral dominance, the clinical application of which has been so efficacious, posits a physiological substratum in the determination of right laterality of motor leads. It conceives as existing a center of chief dominance in the left cerebrum which exerts a dynastic influence over the right cerebrum to insure concerted but unequivocal action. When there is no sufficiently dominant gradient of activity present in either hemisphere, or when such is resident but not heeded (?) in the right hemisphere, what I conceive to be the pathophysiological subsoil of the essential speech dysfunction obtains." In spite of the language the meaning of this seems clear. The author thinks (to repeat, lest it may not be clear) that the "basic cause of stuttering is to be sought in some significant variation in the func-

tional integration of the central nervous system" and not in so-called "mental complexes and emotional maladjustments." This means that, according to the author's thesis, given a normally integrated nervous system, it would not be possible to induce stuttering through emotional experiences, conditioned speech inhibitions, or by imitation. Naturally he rejects the doctrine that stuttering is fundamentally a form of pathology of social response. He grants (p. 135) that "speech is universally recognized as a primarily social function," though throughout his book it is treated as primarily physiological.

Two groups of causes are recognized in the production of stuttering, namely, (1) primary causes, and (2) precipitating factors. Among the first are listed (a) lack of dominant cerebral gradient of control, (b) environmental interference with the development of this control, (c) brain injury, (d) disease. Under the second list are enumerated (a) emotional excitement, (b) exhaustion, (c) emotional shock, (d) fear, (e) timidity, (f) hypersensitivity, (g) feelings of inferiority, (h) self-consciousness, (i) anxiety.

Respecting the relative significance of these causes Travis differs from most other authorities on the subject in that he recognizes the effectiveness of "environmental interference" only in the physiological sense of interfering with the development of brain control, but denies the effectiveness of interference in the form of "so-called complexes and emotional maladjustments."

All forms of speech pathology are grouped under three headings, which are as follows: (1) disorders of rhythm, (2) disorders of articulation and phonation, and (3) disorders of symbolic formulation and expression. Under the first group comes stuttering; under the second may be included what is called incorrect speech, such as lisping, *e.g.*; under the second may be included what is more commonly known as aphasia. This grouping is consistently objective. No psychological or etiological differentiae are recognized.

In support of his theory that stuttering is due to a lack of dominant cerebral gradient of control the author cites studies of preferential use of hands and eyes. To be definitely right- or left-handed is not pathological; to be neither is (p. 57). Bryngelson found 61 per cent of stutterers to be "essentially ambidextrous." Of several hundred right-handed stutterers 43 per cent were found to be originally left-handed (p. 140). The reader is left to work out for himself a theory of causation in the cases of those stutterers who do not fit into the hypothesis here proposed.

Travis attempts to meet the well-nigh unanimous rejection of the

theory of brain centers for speech control by substituting the concept of gradients. A gradient is an area not so specifically demarcated, and one that may even move about from place to place (p. 31). "Gradients constitute relatively large points where the progress of some mode of behavior can be reinforced, deviated, or inhibited. They are loci of heightened integration which in turn may be subjugated in the formation of still higher integrations (p. 27). Presumably this "subjugation" is accomplished by the remaining portion of the cortex, which, "as retained nonrigid tissue, has been conceived by many as subserving propositional thought." "The latter areas," he says, "may be regarded as the highest intracortical gradient."

Concerning his therapeutic program the author says he can only be "briefly directional." The main feature of his program is in harmony with his etiological theory and consists of exercises intended to establish unilateral brain control of the speech mechanism. These include bag punching, ball throwing, tennis playing, jackstones, ping-pong, horseshoes, etc. It seems to be assumed that the brain centers controlling speech will also change gradients if the gradient of control of the hand is made to shift.

Along with the exercises "wholesome suggestion" is administered. The stutterer, we are told, is treated as "an individual to whom it is necessary to sell something." Of 33 stutterers thus treated for two years 26 per cent are reported to have been restored to normal speech. This percentage of successes is somewhat lower than that claimed by methods widely at variance with that of Travis. One is tempted to think that suggestion, the one common factor in all such programs, is a more potent influence than is commonly admitted.

In the book as a whole one cannot but wish that there had been a better system of checks and controls over the data upon which the thesis has been based. In more than one instance the author seems content to overlook significant minorities (in one instance [p. 140] 57 per cent) that do not yield to the explanatory principle which he is trying to defend.

The burden of the book is a defense of the dogma of neurological determinism. The concept of cerebral gradients is brought in to offset the implications of recent investigations in the field of brain physiology. But the concept of (1) a vaguely defined area, which (2) may move about from place to place, and which (3) may become subjugated by the higher associative centers of the brain seems to

lose its significance on close examination. At any rate it does not seem consistent with the doctrine of neurological determinism, which is the cardinal doctrine of the book. The principle of somatogenesis is championed; that of psychogenesis is explicitly rejected. In the diagnosis and treatment of stuttering the jurisdiction of neurology is defended; that of psychology as ordinarily understood is, by implication at least, denied.

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DOLL, PHELPS, and MELCHER. *Mental Deficiency Due to Birth Injuries*. New York: Macmillan Company, 1932. Pp. xiv+275.

With the increasing interest in the education of handicapped children there comes a pressing need for a more comprehensive and intensive study of the physical and mental status as a basis for better diagnosis and treatment. It is only by such studies that we can plan intelligently and evaluate adequately the results of treatment and recast our information and revise our methods which are as yet far from satisfactory. In "Mental Deficiency Due to Birth Injury" by Doll, Phelps, and Melcher, we have a study of this type. The group, however, is small—only twelve cases, in an institution for the feeble-minded. Their life ages ranged from four to thirty-nine years and their mental levels from about two to thirteen years.

The description of physical disability as a result of birth injury is followed by chapters dealing with the evaluation of the mental status. Several chapters discuss in detail the selection of tests and test results. An intercomparison has been made of the responses by the birth injured, feeble-minded and normal groups as to the relative difficulty of the individual tests of the Stanford-Binet Scale. In addition to the estimate of mental status there is a discussion of mental growth based on repeated examination. The chapter on physical therapy stresses the value of relaxation, massage and special exercises in the treatment of this type of case, and there is a detailed description of each case before and after treatment(?).

In the changes in physical efficiency during treatment we assume that physio-therapy played a part but it is impossible to evaluate how much of the change is due to treatment alone(?). Among the younger cases, more particularly in the child under five years, the nervous system though injured may still be developing and changing its pattern of response. Again, if a subject who "needs a cane for walking" puts down his cane and walks alone at the command of

the physiotherapist in their first meeting, we must assume that emotional factors play an enormous and variable part in the response to treatment.

A large part of the book deals with the psychological test results of the twelve subjects, who because of birth trauma suffered both motor paralysis of varying degrees of severity and mental retardation. Seven tests were given in addition to the Stanford-Binet Scale and the results viewed from various angles. The writers concluded that the Stanford-Binet was the most satisfactory measure of the general intelligence of birth injured subjects. As we find among the case reports such statements as "general ability about 13 years, . . . average normal level, . . . and I.Q. 94" we should like to have a more detailed discussion of the clinical picture and the practical problems that these cases presented in order to explain their presence in an institution for the feeble-minded. Moreover, when the I.Q. is given as a satisfactory measure of general intelligence without qualifying statement, it is usually taken as a fairly reliable measure of educability, but in the case of the birth injured we cannot too hastily assume that it will correlate with school success. Case 2 has a mental age score of 9.4 with an I.Q. of 67. When nineteen years old he had a year's instruction with a private tutor three times a week . . . it was reported that he copied story books in printing by the hour. Three years later he showed that he had learned colors, but not numbers and had no practical knowledge of reading. As the diagnostic test of teaching was not given in these cases there is no proof that the Stanford can be taken as a satisfactory guide to school progress for it seems probable that special disabilities may be associated with the brain injury.

Parents and teachers naturally wish to believe that normal mentality is masked by dyskinesia and immediately hope that treatment will radically change the mental status. Consequently the statement (page 227) "there was no doubt that his mental growth was stimulated by the motor development and that he was beginning to gain use of powers which up to that time had lain dormant" carries with it very important implications. It arouses the hope that in other cases mental development will be changed by treatment, but the basis for that hope is not clearly defined. According to the writers the most notable advance in mental expression was the "yes" or "no" reaction which in a sense was considered his first language response. It would seem that this language response gave him an added means of communication but it is not clear that mental growth was stimu-

lated by the added motor control. The learning of the "yes" and "no" response is usually made as the child approaches the two-year level of mental development. Apparently this child had always given the impression of greater intelligence than he was able to express. If he had maintained the consistently slow rate of 50 per cent in his mental development, at three years his understanding of words would have been exceedingly difficult to detect in terms of 18 months behavior, whereas at four years he would have the understanding of language in terms of 2 years behavior which is frequently expressed by a "yes" or "no" response to a variety of direct questions.

All persons concerned in the diagnosis and treatment of children handicapped by dyskinesia, whether due to birth injury or not, should read this book and the psychologist and physiotherapist will probably find it of particular value.

ELIZABETH LORD.

Children's Hospital, Boston, Mass.

COMMUNICATION

The inventory of psychological equipment sketched here is one in use in the Psychological Laboratory of the University of Oklahoma. It is based on the Dewey decimal system of library classification and is an adaptation of a general inventory system in use in Colorado University. Every piece of apparatus is listed on a separate 3" x 5" card, showing its classification, description, distributor, catalog number and cost price. Other items which might be shown are date of accession, state of repair, loss and replacement. These cards are filed in serial order of classification number (and also alphabetically in terms of names of apparatus if desired). The pieces of apparatus are shelved in the same order, with exception of those which, due to size, require special shelving space. Therefore, this system provides a perpetual inventory which facilitates keeping records of what has been purchased, finding a piece of apparatus when it is needed, and taking periodical inventories. The criterion for including an apparatus in a certain class is in terms of principal use, but there are cross-inventories in case of extensive overlapping.

Apparatus. Space will permit the presentation of only the principal classes with an example of each. A000 Magnifying, projecting, refracting, reflecting, photographing, etc.: A001.10 compound micro-

scope. A100 Cutting, drilling, probing, etc.: A120.00 scissors, small, fine pointed. A200 Measuring: A210.31 thermometer, 110° C., 9½". A300 Heating and cooling: A322.10 electric hot plate, "600, 110V, AC, low med., full. A400 Holding, supporting, containing, etc.: A414.12 table clamp, 5½ cm. A500 Specimens, models, charts, etc.: A502.00 specimen, left hemisphere, human brain. A600 Stimulating: A610.20 Galton whistle. A700 Reacting: A701.30 ergograph. A800 Physical and psychological tests: A810.00 wet spirometer. A900 Miscellaneous apparatus: A923.00 drawing set. This class may include tools, chemicals, glassware, lumber, nails, screws, rubber goods, etc.

Furniture. F000 Tables: F028.711 table, pine, natural, 2 drawers. F100 Desks: F184.006 stenographer's desk, 4 drawers. F200 Chairs: F202.931 folding chair, leather seat. F300 Stools: F300.084 laboratory stool, metal, olive-green. F400 Filing cases: F400.049 card file, 3" x 5", fiber. F500 Cases, cabinets and shelves: F514.106 book case, sectional, oak, glass doors. F600 Office appliances: F599.999 pencil sharpener, Chicago. F700 Rugs and carpets: F720.100 rug, 9' x 12', Wilton, bluish. F800 Miscellaneous furniture: F839.989 waste basket, wire. F900 Unclassified furniture: F960.989 desk lamp. (F800 and F900 could be combined.)

By adding numbers beyond the decimal point it is possible to make the division of any class sufficiently fine to include all possible items. As a general rule, the ninth decile in each class is reserved for unclassified apparatus of that class.

M. O. WILSON.

Oklahoma University.

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